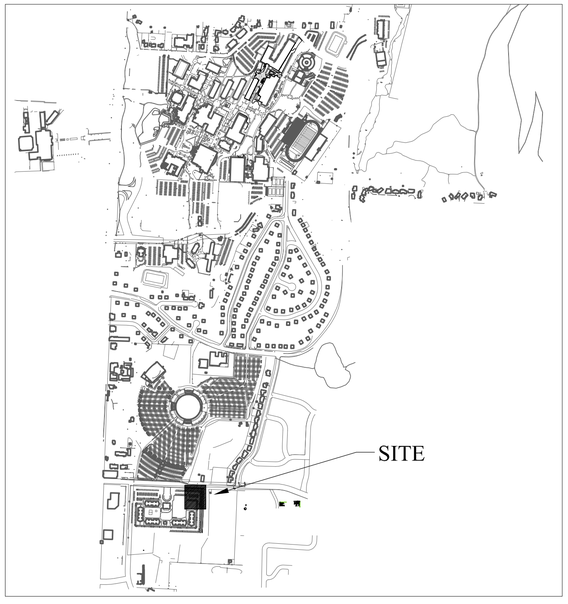
WEBER STATE UNIVERSITY

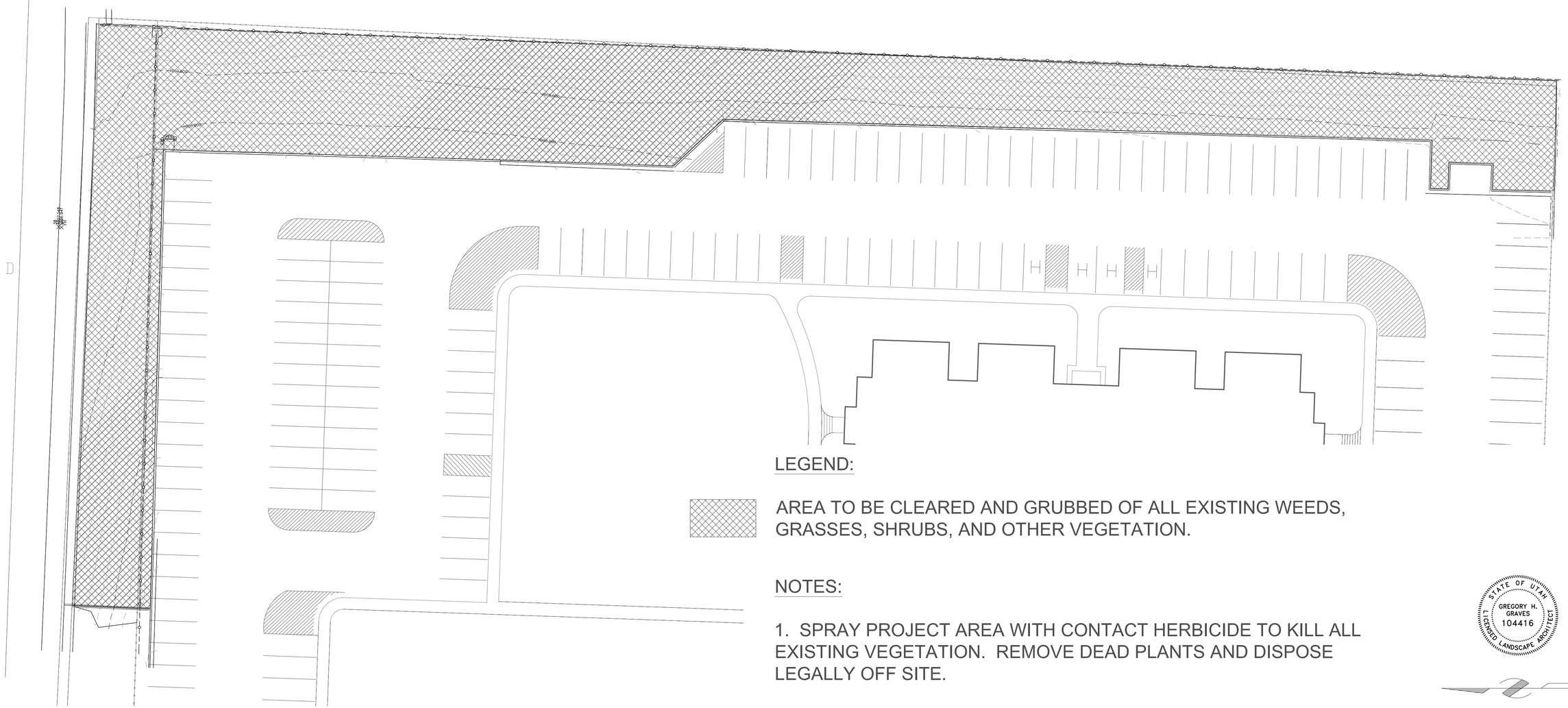
STUDENT HOUSING HILLSIDE RENOVATION



LOCATION MAP

PREPARED BY:
BINGHAM ENGINEERING INC.
5225 WILEY POST WAY SUITE 200
SALT LAKE CITY, UT 84116
(801) 532-2520

PACKAGE INDEX:



LEGEND:

AREA TO BE CLEARED AND GRUBBED OF ALL EXISTING WEEDS, GRASSES, SHRUBS, AND OTHER VEGETATION.

NOTES:

1. SPRAY PROJECT AREA WITH CONTACT HERBICIDE TO KILL ALL EXISTING VEGETATION. REMOVE DEAD PLANTS AND DISPOSE LEGALLY OFF SITE.

STATE OF UTAH
GREGORY H. GRAVES
104416
LICENSED LANDSCAPE ARCHITECT

0 20 40 60
Scale in Feet

Rev.	By	Date	Remarks
1	GHG	5/24/07	RE-ISSUED FOR BID
0	GHG	3/22/07	ISSUED FOR BID

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STUDENT HOUSING
HILLSIDE RENOVATION
DEMOLITION
PLAN

BINGHAM ENGINEERING
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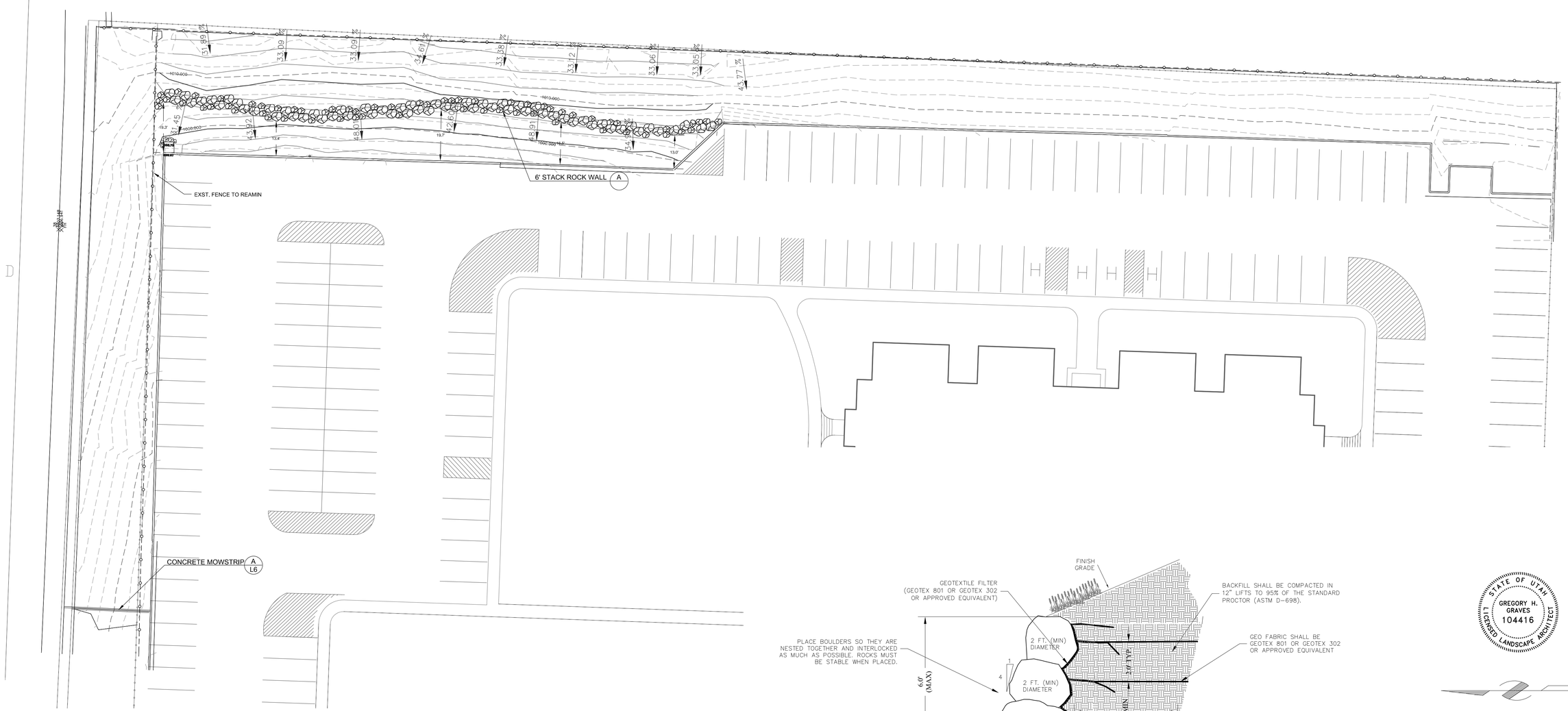


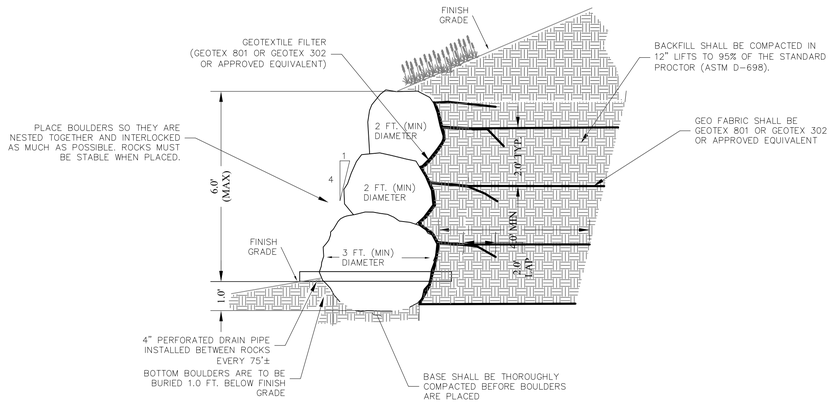
LEGEND

EXISTING MAJOR CONTOUR

EXISTING MINOR CONTOUR

PROPOSED MAJOR CONTOUR

PROPOSED MINOR CONTOUR



A 6' STACK ROCK WALL
NTS

STATE OF UTAH
GREGORY H. GRAVES
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GRADING & LAYOUT

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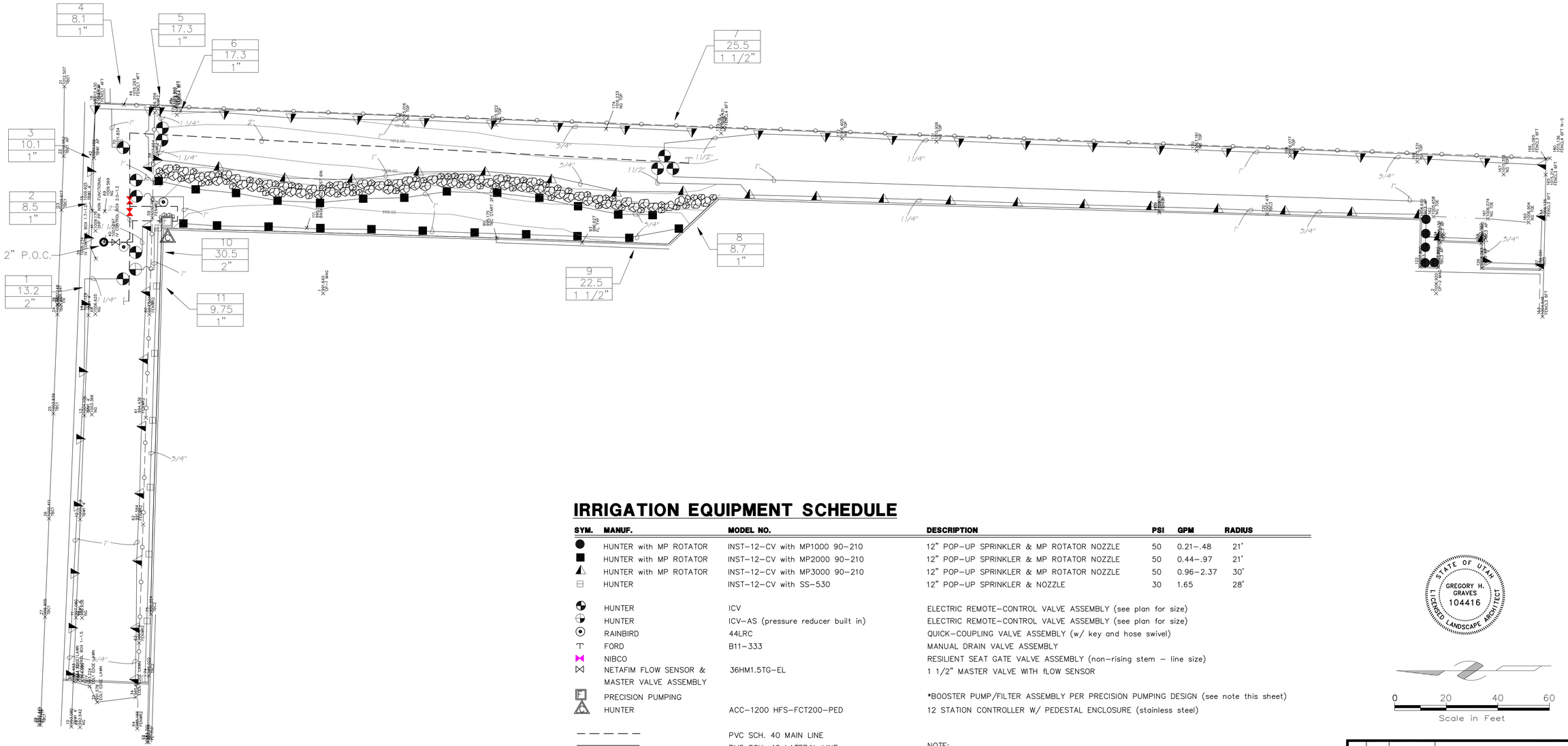

IRRIGATION EQUIPMENT SCHEDULE

SYM.	MANUF.	MODEL NO.	DESCRIPTION	PSI	GPM	RADIUS
●	HUNTER with MP ROTATOR	INST-12-CV with MP1000 90-210	12" POP-UP SPRINKLER & MP ROTATOR NOZZLE	50	0.21-.48	21'
■	HUNTER with MP ROTATOR	INST-12-CV with MP2000 90-210	12" POP-UP SPRINKLER & MP ROTATOR NOZZLE	50	0.44-.97	21'
◭	HUNTER with MP ROTATOR	INST-12-CV with MP3000 90-210	12" POP-UP SPRINKLER & MP ROTATOR NOZZLE	50	0.96-2.37	30'
⊟	HUNTER	INST-12-CV with SS-530	12" POP-UP SPRINKLER & NOZZLE	30	1.65	28'
	HUNTER	ICV	ELECTRIC REMOTE-CONTROL VALVE ASSEMBLY (see plan for size)			
	HUNTER	ICV-AS (pressure reducer built in)	ELECTRIC REMOTE-CONTROL VALVE ASSEMBLY (see plan for size)			
	RAINBIRD	44LRC	QUICK-COUPLING VALVE ASSEMBLY (w/ key and hose swivel)			
	FORD	B11-333	MANUAL DRAIN VALVE ASSEMBLY			
	NIBCO		RESILIENT SEAT GATE VALVE ASSEMBLY (non-rising stem - line size)			
	NETAFIM FLOW SENSOR & MASTER VALVE ASSEMBLY	36HM1.5TG-EL	1 1/2" MASTER VALVE WITH fLOW SENSOR			
	PRECISION PUMPING		*BOOSTER PUMP/FILTER ASSEMBLY PER PRECISION PUMPING DESIGN (see note this sheet)			
	HUNTER	ACC-1200 HFS-FCT200-PED	12 STATION CONTROLLER W/ PEDESTAL ENCLOSURE (stainless steel)			
— — — — —		PVC SCH. 40 MAIN LINE				
———		PVC SCH. 40 LATERAL LINE				

NOTE:

*CONTRACTOR SHALL ORDER AND PURCHASE BOOSTER PUMP/FILTER ASSEMBLY FROM THE FOLLOWING SOURCE:

PRECISION PUMPING, 6515 BUSINESS WAY, BOISE, IDAHO 83716, 208.323.5300 (PHONE), 208.323.5311 (FAX), CONTACT PERSON - ROB ALDINGER, rob@purdyent.com SEE SHEET 7 FOR DETAIL.

ALSO NOTE THAT 3 PHASE 220V POWER SHALL BE REQUIRED FOR THE PUMP STATION, AND SINGLE PHASE 120V POWER FOR THE CONTROLLER. CONTRACTOR SHALL COORDINATE WITH WEBER STATE UNIVERSITY ELECTRICAL SHOP TO INSURE THIS IS DONE EFFICIENTLY. ANY QUESTIONS SHALL BE REFERRED TO THE ELECTRICAL ENGINEER THROUGH BINGHAM ENGINEERING.

CONTRACTORE SHALL MAKE A NEW CONNECTION TO THE WATER MAIN LINE LOCATED IN 4600 S. THE TAP SHALL BE 2" SIZE. COORDINATE WORK WITH WEBER BASIN WATER CONSERVANCY DISTRICT, (801) 771-1677. CONTACT: LLOYD STOUT OR DARREN HESS.

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STUDENT HOUSING HILLSIDE RENOVATION IRRIGATION PLAN

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IRRIGATION NOTES

1. IRRIGATION PLAN IS DIAGRAMMATIC. ALL IRRIGATION EQUIPMENT SHALL BE LOCATED IN PLANTING AREAS ONLY, UNLESS NOTED OTHERWISE. REFER TO THE IRRIGATION LEGEND, DETAILS, AND SPECIFICATIONS FOR EQUIPMENT AND INSTALLATION. SPECIFICATIONS SHALL TAKE PRECEDENCE OVER INSTALLATION DETAILS.

LANDSCAPE CONTRACTOR SHALL VERIFY LOCATION OF IRRIGATION POINT OF CONNECTION (POC) AND THE STATIC WATER PRESSURE AT THAT LOCATION PRIOR TO BEGINNING ANY IRRIGATION WORK. THIS INFORMATION WILL BE REQUIRED BY THE PUMP MANUFACTURER TO PROPERLY SIZE AND DESIGN THE PUMP/FILTER ASSEMBLY.

3. CONTRACTOR SHALL KEEP THE PREMISES CLEAN AND FREE OF EXCESS EQUIPMENT, MATERIALS AND RUBBISH INCIDENTAL TO WORK OF THIS SECTION.

4. PIPE FITTINGS SHALL BE AS FOLLOWS:
A. ALL RISERS AND EXPOSED FITTINGS SHALL BE P.V.C. SCHEDULE 80.
B. ALL UNDERGROUND FITTINGS SHALL BE P.V.C. SCHEDULE 40.
C. ALL MAINLINE TWO (2) INCH OR SMALLER SHALL USE SOLVENT WELD PVC FITTINGS.

5. IRRIGATION CONTROL WIRES SHALL CONFORM TO THE FOLLOWING:
A. ALL WIRE SHALL BE TYPE UF, 600 VOLT, SOLID COPPER , SINGLE CONDUCTOR WIRE. IT SHALL BE UL LISTED, DIRECT BURIAL TYPE, AND MINIMUM SIZE OF 14 GAUGE. ALL SPLICES AND CONNECTIONS SHALL BE WATER-TIGHT USING 3M DBY DIRECT BURY WIRE SPLICE KITS. ALL WIRES SHALL BE INSTALLED WITH TWO (2) FEET OF EXCESS WIRE (COILED) AT THE END OF EACH WIRE RUN, WIRE SPLICE, AND AT EACH CONTROLLER.
B. CONTROL WIRE SHALL BE BUNDLED EVERY 10' AND PLACED ADJACENT TO MAIN LINE. ALL WIRE SPLICES SHALL BE LOCATED IN SEPARATE 10" ROUND VALVE BOXES.

6. MANUAL DRAIN VALVES SHALL BE PLACED ON THE MAIN LINE AT ALL LOW SPOTS TO ENSURE COMPLETE DRAINAGE AND WINTERIZATION OF MAIN LINE. ALL MANUAL DRAINS SHALL BE PLACE IN SEPARATE VALVE BOXES PER INSTALLATION DETAILS.

7. CHECK VALVES SHALL BE USED WHERE INDICATED AND WHERE NECESSARY TO PREVENT WATER FLOW FROM LOWER ELEVATION HEADS WHEN SYSTEM IS TURNED OFF. INSTALL PER MANUFACTURE'S RECOMMENDATION, WITH A ONE (1) CU. FT. MIN. GRAVEL SUMP AROUND EACH CHECK VALVE.

8. ALL POP-UP SPRAY SPRINKLERS SHALL CONFORM TO THE FOLLOWING UNLESS SPECIFICALLY NOTED OTHERWISE ON THE PLANS:
A. SPRINKLERS LOCATED IN PLANTING BEDS SHALL BE TWELVE (12) INCHES IN HEIGHT.

9. ALL PRESSURE MAIN LINES SHALL HAVE A MINIMUM OF EIGHTEEN (18) INCHES TO THIRTY (30) INCHES OF COVER, AND ALL LATERAL LINES SHALL HAVE EIGHT (8) INCHES TO FOURTEEN (14) INCHES OF COVER. TRENCH BEDDING AND BACKFILL MATERIAL SHALL BE EXISTING SITE SOIL FREE OF ROCKS, DEBRIS, ETC. GREATER THAN ONE (1) INCH IN ANY DIMENSION THAT MAY DAMAGE IRRIGATION PIPE OR EQUIPMENT. IN THE EVENT OF BACKFILL SETTLEMENT, CONTRACTOR SHALL PERFORM REQUIRED REPAIRS AT HIS OWN COST.

10. WHERE POSSIBLE, ALL AUTOMATIC CONTROL VALVES SHALL BE LOCATED AND INSTALLED IN GREEN VALVE BOXES, ONE VALVE PER BOX, WITH FOUR (4) INCHES OF 3/4" GRAVEL BENEATH THE VALVE. NO VALVE MANIFOLDS SHALL BE ALLOWED. ISOLATION GATE VALVES ON MAIN LINES SHALL BE LOCATED IN SEPARATE VALVE BOXES.

11. ALL MAIN LINE AND LATERAL LINES SHALL BE SLEEVED WITH P.V.C. SCHEDULE 40 PIPE (4" AND UNDER) OR CLASS 200 (GREATER THAN 4") WHERE THEY PASS UNDER PAVED AREAS. SLEEVE SIZE SHALL BE TWICE THE DIAMETER OF THE LINE TO BE SLEEVED UNLESS OTHERWISE NOTED ON THE PLANS.

12. PRIOR TO BACKFILLING IRRIGATION TRENCHES:
A. ALL MAIN LINES IN THE SYSTEM SHALL BE CAPPED AND PRESSURE TESTED AT 125 P.S.I. FOR A PERIOD OF FOUR (4) HOURS. ANY LEAKS FOUND SHALL BE CORRECTED BY REMOVING THE LEAKING PIPE OR FITTINGS AND INSTALLING NEW MATERIAL IN ITS PLACE. REPEAT PRESSURE TEST TO ASSURE ABSENCE OF LEAKS.
B. THE CONTRACTOR SHALL NOT ALLOW NOR CAUSE ANY OF HIS WORK TO BE COVERED UNTIL IT HAS BEEN INSPECTED, TESTED AND APPROVED BY THE OWNER/OWNER'S AUTHORIZED REPRESENTATIVE.
C. WHERE MAIN LINE WILL BE ALLOWED TO SIT UNCOVERED FOR ANY LENGTH OF TIME IN THE TRENCH PRIOR TO TESTING, SHADE MAIN LINE WITH A THIN COVERING OF SOIL TO MINIMIZE WEATHER-RELATED EXPANSION OR CONTRACTION OF PIPE.

13. IRRIGATION CONTRACTOR SHALL ADJUST ALL HEADS TO PROVIDE A UNIFORM COVERAGE AND TO KEEP SPRAY OFF PARKING AREAS, AND DRIVES.

14. WHEN THE SPRINKLER SYSTEM IS COMPLETED THE CONTRACTOR SHALL, IN THE PRESENCE OF THE OWNER/OWNER'S AUTHORIZED REPRESENTATIVE, PERFORM A COVERAGE TEST OF WATER PROVIDED TO THE PLANTING AREAS TO ENSURE IT IS CONSISTENT AND UNIFORM. THE CONTRACTOR SHALL FURNISH ALL MATERIALS AND PERFORM ALL WORK REQUIRED TO CORRECT ANY INADEQUACIES OF COVERAGE AT HIS OWN COST.

15. THE CONTRACTOR SHALL FURNISH TO THE OWNER A COMPLETE "AS BUILT" DRAWING ON MYLAR AND TWO PRINTS SHOWING EXACT LOCATIONS OF ALL ITEMS INSTALLED. THESE ARE TO BE DELIVERED ON OR BEFORE FINAL INSPECTION.

16. A REDUCED IRRIGATION PLAN INDICATING ALL SYSTEMS AND THEIR APPROPRIATE SEQUENCED VALVES SHALL BE LAMINATED IN MYLAR AND MOUNTED ON THE INSIDE COVER OF THE IRRIGATION CONTROLLER(S).

17. IRRIGATION CONTRACTOR SHALL MAINTAIN THE SYSTEM FOR THE DURATION OF THE CONTRACT PERIOD.

18. IRRIGATION CONTRACTOR SHALL GUARANTEE THE ENTIRE IRRIGATION SYSTEM TO BE FREE OF DEFECTS IN WORKMANSHIP AND MATERIALS FOR A PERIOD OF ONE (1) YEAR FROM FINAL ACCEPTANCE BY THE OWNER.

IRRIGATION MAINTENANCE NOTES

IT IS THE OWNER'S RESPONSIBILITY TO SUPPLY THESE PLANS WITH THE FOLLOWING NOTES AND SPECIFICATIONS, ALONG WITH CONTRACTOR DRAWN "AS BUILT" PLANS TO ANY AND ALL FUTURE OWNERS AND MAINTENANCE COMPANIES.

1. THE PURPOSE OF THIS SPRINKLER SYSTEM IS TO PROVIDE ONLY SUFFICIENT WATER TO MAINTAIN PLANT LIFE DURING DRY WEATHER CONDITIONS OR SUMMER SEASONS. TIME CLOCKS SHALL BE READJUSTED CONTINUOUSLY THROUGHOUT THE SEASON, ON A WEEKLY BASIS IF NECESSARY, TO PROVIDE WATER ONLY WHEN THE SOIL IS DRY AT A DEPTH OF FOUR (4) INCHES THE FIRST INITIAL GROWING SEASON AND SIX (6) INCHES THE FOLLOWING YEARS. IF THE GROUND IS MOIST EITHER AT THE SURFACE OR A DEPTH OF FOUR (4) INCHES DURING THE FIRST YEAR AFTER INITIAL PLANT ESTABLISHMENT, OR IS MOIST AT A DEPTH OF SIX (6) INCHES THEREAFTER, SHUT THE TIME CLOCKS OFF AND DO NOT APPLY ADDITIONAL WATER UNTIL SOIL HAS BEEN ALLOWED TO DRY. READJUST TIME CLOCK PRIOR TO TURNING VALVES BACK ON. IF RAIN IS FORECAST OR IS EMINENT, ALL IRRIGATION SYSTEMS SHALL BE SHUT OFF AND NOT REACTIVATED UNTIL THE SOIL HAS DRIED TO THE ABOVE DEPTHS.

2. IF ANY SUBSURFACE DRAINAGE OR RUN-OFF IS VISIBLE AT LOW AREAS, ACROSS PAVING OR AT LOWER PORTIONS OF SLOPES, IMMEDIATELY SHUT THE VALVES OFF TO ALLOW THE AREA TO COMPLETELY DRY OUT. IF THIS CONDITION CONTINUES AFTER SUBSEQUENT WATERINGS, A QUALIFIED GEOLOGIST OR GEOTECHNICAL ENGINEER MUST BE RETAINED TO PROVIDE RECOMMENDATIONS TO ELIMINATE SUBSURFACE WATER OR DRAINAGE PROBLEMS. IF DURING NORMAL IRRIGATION, PONDING TAKES PLACE ON ANY LANDSCAPE AREA, DRIVES, PARKING AREAS OR ANY OTHER AREA, THE IRRIGATION SYSTEM SHALL BE IMMEDIATELY SHUT OFF AND A LICENSED CIVIL ENGINEER SHALL BE IMMEDIATELY CONTACTED TO PROVIDE RECOMMENDATIONS FOR POSITIVE AND PROPER DRAINAGE.

3. INSPECTIONS OF IRRIGATION SYSTEM SHALL BE MADE ON A DAILY BASIS TO OBSERVE AND PROVIDE REPAIRS OR REMEDIES TO THE FOLLOWING UNACCEPTABLE PROBLEMS:
A. OVER-SPRAY ON SIDEWALKS, STREETS, PAVED AREAS, PARKING AREAS, FENCES, WALLS, BUILDINGS OR STRUCTURES.
B. DRAINAGE OR RUN-OFF ACROSS SIDEWALKS, PAVING OR STREETS.
C. DAMAGED OR IMPROPERLY OPERATING HEADS, PIPING, VALVES, CONTROLLERS OR OTHER IRRIGATION EQUIPMENT.
D. IMPROPERLY ADJUSTED OR OPERATING MOISTURE SENSORS.

4. ONLY LICENSED AND QUALIFIED LANDSCAPE CONTRACTORS AND LANDSCAPE MAINTENANCE INDIVIDUALS SHALL PROVIDE OR MAKE REPAIRS TO IRRIGATION SYSTEM.

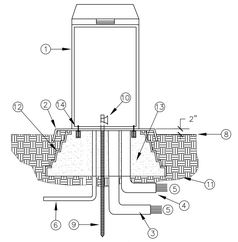
5. AT ALL TIMES, THE LANDSCAPE CONTRACTOR OR MAINTENANCE CONTRACTOR SHALL ASSIGN A QUALIFIED INDIVIDUAL OR INDIVIDUALS TO INSPECT AND MONITOR THE IRRIGATION SYSTEM. OWNERS SHALL BE SUPPLIED WITH 24 HOUR EMERGENCY PHONE NUMBERS FOR USE IN REPORTING BROKEN OR DAMAGED IRRIGATION EQUIPMENT.

6. ALL IRRIGATION EQUIPMENT REQUIRES CONTINUOUS MAINTENANCE, CLEANING, ADJUSTMENT, PARTS REPLACEMENT AND INSPECTION. IT IS THE RESPONSIBILITY OF THE LANDSCAPE CONTRACTOR OR LANDSCAPE MAINTENANCE COMPANY TO PROVIDE THESE SERVICES ON A CONTINUAL AND REGULAR BASIS AND SCHEDULE.

7. WATER SHALL BE APPLIED TO PLANTING AREAS IN SHORT INTERVALS OR MOISTURE SENSORS SHALL BE ADJUSTED TO PROHIBIT ANY SURFACE PONDING OR RUN-OFF, AND AT NO TIME SHALL WATER BE APPLIED TO CAUSE SOIL SATURATION.

8. OVERWATERING CAN RESULT IN DEATH OF PLANTS, POSSIBLE SOIL EXPANSION AND DAMAGE TO CONCRETE AND ASPHALT PAVING, DAMAGE TO FOUNDATIONS AND POSSIBLE LOSS OF SOIL COMPACTION. A QUALIFIED GEOTECHNICAL ENGINEER SHALL BE RETAINED TO PROVIDE SITE INSPECTIONS AT LEAST ON AN ANNUAL BASIS TO INSPECT FOR EXCESS SOIL MOISTURE.

ENSURING THAT THE ABOVE PRECAUTIONS, REPAIRS AND CONTINUING MAINTENANCE ARE PROPERLY PERFORMED IS THE RESPONSIBILITY OF THE OWNER. THE LANDSCAPE ARCHITECT HAS BEEN RETAINED TO PREPARE THESE PLANS ONLY, AND DOES NOT PROVIDE POST CONSTRUCTION REVIEWS NOR REVIEWS OF ON-SITE MAINTENANCE. THE LANDSCAPE ARCHITECT DOES NOT ASSUME RESPONSIBILITY NOR LIABILITY OF MAINTENANCE OR REVIEW OF MAINTENANCE WORK OR REPAIRS OR DAMAGES RESULTING FROM LACK OF REPAIRS, MAINTENANCE, ADJUSTMENTS OR IMPROPER INSTALLATION OF IRRIGATION EQUIPMENT.



1. CONTROLLER AND CONTROLLER ENCLOSURE – SEE IRRIGATION EQUIPMENT SCHEDULE
2. QUICKPAD 3/16" MIN. THICKNESS ALUMINUM POWDER COATED PREFORMED PAD
3. PVC SWEEP ELL STATIONS 1-24
4. PVC SWEEP ELL STATIONS 25-40 (IF APPLICABLE)
5. DIRECT BURIAL CONTROL WIRES TO CONTROL VALVES
6. 110-VOLT SERVICE IN CONDUIT
7. NOT USED
8. FINISH GRADE
9. 5/8" X 8' COPPER GROUND ROD
10. BRONZE GROUND CLAMP
11. SUBGRADE COMPACTED TO 90%
12. PREFORMED PAD SUPPORT BASE
13. FILL INSIDE BASE WITH PEA GRAVEL
14. QUICKPAD FASTENING BRACKET (2)

A CONTROLLER & ENCLOSURE
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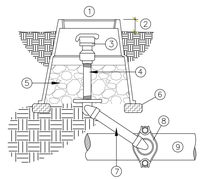
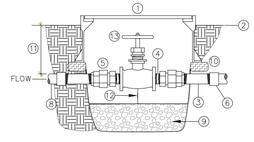


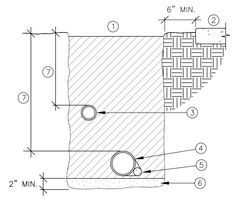
1. 10" ROUND GREEN PLASTIC VALVE BOX, CARSON-BROOKS 910 OR EQUAL
2. HEIGHT ABOVE FINISH GRADE: 1 1/2" IN TURF AREAS (SODDED); 1" IN TURF AREAS (SEEDED); 2" IN PLANTING AREAS
3. QUICK COUPLER VALVE – SEE EQUIPMENT SCHEDULE
4. BRASS NIPPLE, LENGTH AS REQUIRED
5. 6" MIN. DEPTH CLEAN PEA GRAVEL
6. REDWOOD OR BRICK BLOCKING, TYPICAL
7. 12" LASCO UNITIZED SWING JOINT W/ BRASS INSERT STABILIZER ELBOW, OR 12" SPEARS SWING JOINT RISER ASSEMBLY W/ BRASS FEMALE THREAD 90° ELL OUTLET
8. DUCTILE IRON SERVICE SADDLE W/ S.S. STRAP (SIDE MOUNTED, SIZE AS REQUIRED)
9. PVC MAIN LINE

B QUICK COUPLING VALVE
NTS



1. 10" ROUND PLASTIC VALVE BOX, W/ LOCK BOLT, CARSON-BROOKS 910 OR EQUAL, MARKED "G.V." WITH 2" WHITE LETTERS
2. FINISH GRADE
3. METAL NIPPLE, 12" MIN. LENGTH, PER BELOW: 1" – 1 1/4" DIA. = GALVANIZED STEEL NIPPLE 1 1/2" – 3" DIA. = DUCTILE IRON NIPPLE
4. 2" NIPPLE, DIA. AS REQUIRED
5. BRASS UNION (TYP.)
6. PVC SCH. 80 FEMALE ADAPTER (TYP.)
7. BELL x FLANGE METAL ADAPTER (TYP.)
8. PVC MAINLINE
9. 4" MIN. DEPTH CLEAN PEA GRAVEL
10. 2"x4" REDWOOD OR BRICK BLOCKING (TYP.)
11. DEPTH – SEE NOTES
12. 2" MINIMUM CLEARANCE REQUIRED
13. GATE VALVE (LINE SIZE) – SEE EQUIPMENT SCHEDULE

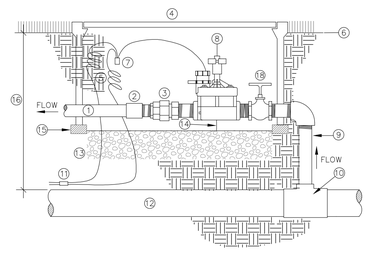
C ISOLATION GATE VALVE
NTS



1. BACKFILL MATERIAL – SEE NOTES, COMPACT TO 90% MIN.
2. ADJACENT HARD SURFACE
3. NON-PRESSURE LATERAL LINE
4. PRESSURE MAIN LINE
5. DIRECT BURIAL, LOW VOLTAGE CONTROL WIRES; TAPE AND BUNDLE AT 10 FT. O.C.
6. BEDDING MATERIAL – SEE NOTES
7. PIPE DEPTHS – SEE NOTES

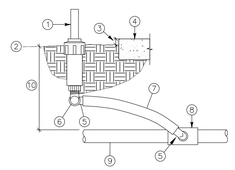
NOTE: SEE SLEEVING DETAIL FOR TRENCHING IN PAVED AREAS.

D TRENCH DETAIL
NTS



1. LATERAL LINE
2. PVC SCH. 80 FEMALE ADAPTER
3. PVC SCH. 80 UNION
4. GREEN PLASTIC VALVE BOX W/ BOLT LOCK (CARSON-BROOKS OR APPROVED EQUAL), SIZE AS REQUIRED
5. PROVIDE 12" EXPANSION LOOP AT EACH WIRE CONNECTOR IN BOX
6. FINISH GRADE
7. WATER TIGHT WIRE CONNECTORS (TYP.)
8. ELECTRIC CONTROL VALVE – SEE IRRIGATION EQUIPMENT SCHEDULE
9. SCH. 80 PVC NIPPLE, LENGTH AS REQUIRED
10. SCH. 40 PVC TEE
11. WIRES TO CONTROLLER, TAPE AND BUNDLE EVERY 10' – SEE TRENCH DETAIL
12. PVC MAIN LINE
13. 4" MIN. DEPTH PEA GRAVEL
14. 2" MIN. CLEARANCE REQUIRED
15. 2"x4" REDWOOD OR BRICK BLOCKING (TYP.)
16. DEPTH – SEE NOTES
17. GATE VALVE (LINE SIZE)

E CONTROL VALVE ASSEMBLY
NTS



1. POP-UP SPRAY HEAD – SEE LEGEND
2. FINISH GRADE
3. 1" – 1 1/2"
4. NOTE: ALL SPRAY HEADS TO BE PLACED 2" CLEAR OF ALL HARDSCAPE SURFACES
5. SWING PIPE ELL WITH SPIRAL BARB FITTING (TYP.)
6. MARLEX STREET ELL
7. FLEXIBLE SWING PIPE, 12" MIN. LENGTH
8. PVC SCH 40 SxSxT TEE (OR ELL)
9. PVC LATERAL LINE, SIZE AS NOTED ON PLAN
10. DEPTH – SEE NOTES & TRENCH DETAIL

F 4" POP-UP SPRAY SPRINKLER
NTS

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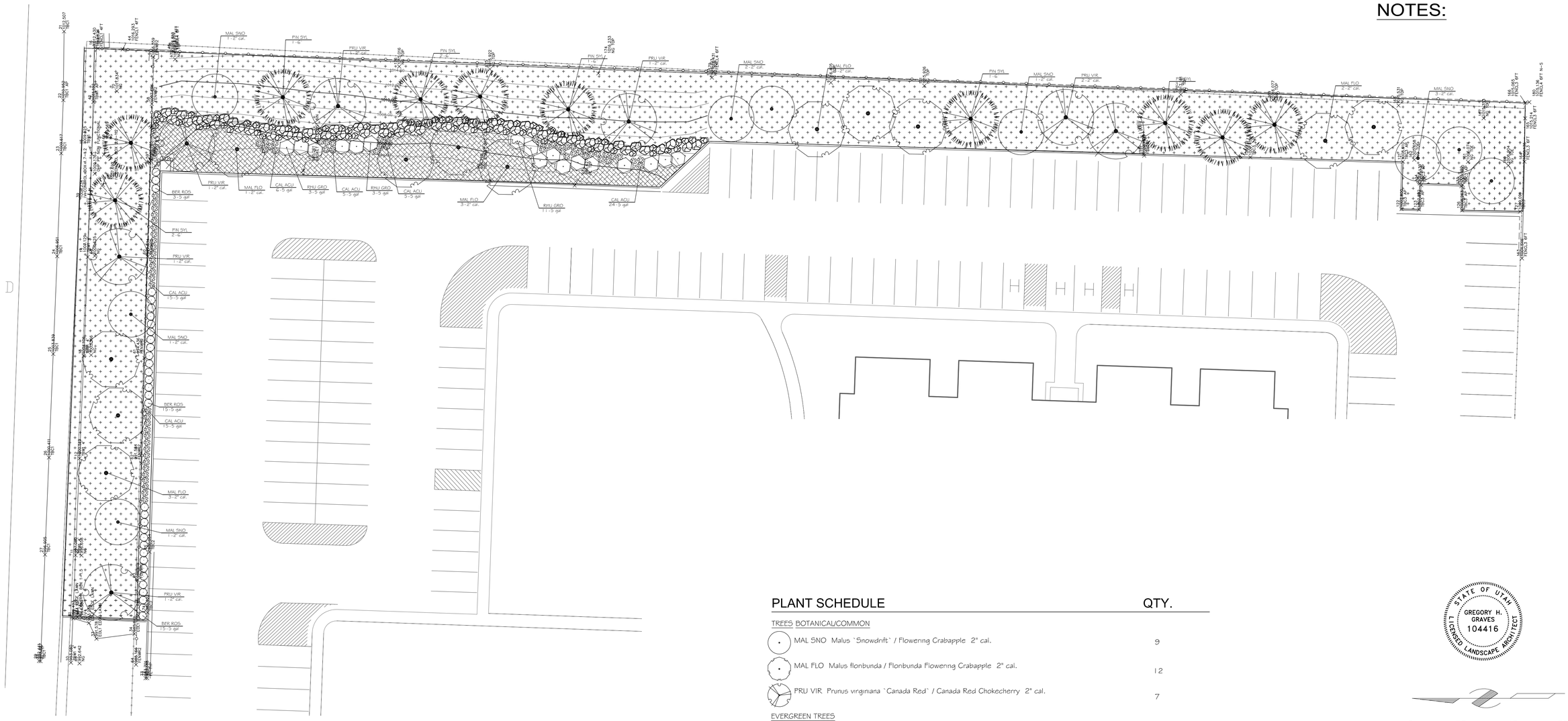
NOTES:



PLANT SCHEDULE

		QTY.
TREES BOTANICAL/COMMON		
MAL SNO	Malus `Snowdrift` / Flowering Crabapple 2" cal.	9
MAL FLO	Malus floribunda / Floribunda Flowering Crabapple 2" cal.	12
PRU VIR	Prunus virginiana `Canada Red` / Canada Red Chokecherry 2" cal.	7
EVERGREEN TREES		
PIN SYL	Pinus sylvestris / Scotch Pine 6`	10
SHRUBS		
BER ROS	Berberis thunbergii `Rose Glow` / Rosy Glow Barberry 5 gal	33
RHU GRO	Rhus aromatica `Gro-Low` / Gro-Low Fragrant Sumac 5 gal	17
GRASSES		
CAL ACU	Calamagrostis acutifolia `Karl Foerster` / Foerster`s Reed Grass 5 gal	70
PERENNIALS		
	Fragaria 'Vesca' (+/-2,455 s.f.) F/36 Perennial to be planted 12" o.c.	69
SLOPE SAVER SEED		
	Slope Saver from Agronotec (+/-20,542 s.f.) Hydroseed Seed at 8 lbs per 1,000 sf	

After proper cleaning, installation of irrigation system, prep soil and irrigate. Allow weed seeds to sprout and grow to 2" height. Spray again using contact herbicide to kill all vegetation. Remove dead plants and begin planting operations. Seed with Slope Saver, watering daily until established. Seed should be kept moist, not wet. Fertilize with 21-7-14 fertilizer 10-14 days after planting.

MOWSTRIP

STATE OF UTAH
GREGORY H. GRAVES
104416
LICENSED LANDSCAPE ARCHITECT

0 20 40 60
Scale in Feet

Rev.	By	Date	Remarks
1	GHG	5/24/07	RE-ISSUED FOR BID
0	GHG	3/22/07	ISSUED FOR BID

WEBER STATE UNIVERSITY

STUDENT HOUSING HILLSIDE RENOVATION PLANTING PLAN

BINGHAM ENGINEERING
SALT LAKE CITY - (801) 532-2520
OGDEN - (801) 399-1662

Dsn: CGR
Drw: CGR
Chk: GHG
Rvw: GHG

Sht 5 of 11

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PLANTING NOTES

1. THE PLANTING PLAN IS DIAGRAMMATIC, AND ALL PLANT LOCATIONS ARE APPROXIMATE.
A. PLANT SYMBOLS TAKE PRECEDENCE OVER PLANT QUANTITIES SPECIFIED ON PLANS.
B. CONTRACTOR SHALL VERIFY PLANT QUANTITIES AND NOTIFY THE LANDSCAPE ARCHITECT OF ANY DISCREPANCIES BETWEEN QUANTITIES AND SYMBOLS SHOWN.

2. PRIOR TO PLANTING, THE IRRIGATION SYSTEM SHALL BE FULLY OPERATIONAL AND ALL PLANTING AREAS SHALL BE THOROUGHLY MOISTENED.

3. LANDSCAPE CONTRACTOR SHALL APPLY A CONTACT HERBICIDE TO ALL PLANTING AREAS WHERE WEEDS OR UNDESIRABLE VEGETATION ARE PRESENT PER MANUFACTURERS SPECIFICATIONS A MINIMUM OF TEN (10) DAYS PRIOR TO COMMENCEMENT OF ANY PLANTING OR IRRIGATION WORK. WEEDS SHALL BE ALLOWED TO COMPLETELY DIE BACK, INCLUDING THE ROOTS, BEFORE PROCEEDING WITH WORK. DEAD WEEDS SHALL BE REMOVED FROM THE SITE. REPEAT PROCESS A SECOND TIME.

4. ALL FINISHED GRADES SHALL BE APPROVED BY THE OWNER/OWNER'S AUTHORIZED REPRESENTATIVE PRIOR TO INSTALLATION OF ANY PLANT MATERIALS.

5. HYDROSEED SHALL CONFORM TO THE FOLLOWING:
A. WOOD FIBER MULCH SHALL BE VIRGIN WOOD FIBER, FREE OF GROWTH OR GERMINATION INHIBITING SUBSTANCES. MULCH SHALL BE AIR DRIED WITH NO MORE THAN 15% MOISTURE BY WEIGHT. TOTAL ORGANIC WEIGHT SHALL BE A MINIMUM OF 98%. INORGANIC ASH CONTENT SHALL BE 0.7+/−0.2 PERCENT. WATER HOLDING CAPACITY SHALL BE 1000G/100G (OVEN DRIED WEIGHT BASIS). PH RANGE SHALL BE 4.0−6.0. FIBER LENGTH SHALL MEET THE FOLLOWING:
   i. 30% MINIMUM SHALL BE AT LEAST 0.15 INCHES IN LENGTH OR LONGER
   ii. 50% MINIMUM SHALL BE RETAINED ON THE 28 MESH SCREEN.
B. SEE PLANT SCHEDULE FOR SEED MIX.
C. PROVIDE WRITTEN CERTIFICATION THAT SEED CONFORMS TO UTAH SEED LAW IN COMPLIANCE WITH UTAH STATE DEPT. OF AGRICULTURE REGULATIONS.
D. ORGANIC TACKIFIER SHALL BE "M−BINDER" AS MANUFACTURED BY ECOLOGY CONTROLS, "TYPE−M" AS MANUFACTURED BY AGRO TACK, "STA WET" AS MANUFACTURED BY POLYSORB, INC. OR APPROVED EQUAL.
E. APPLICATION RATE PER 1000 SQUARE FEET IS AS FOLLOWS:
   1. 35 POUNDS OF WOOD FIBER MULCH.
   2. SEE PLANT LIST FOR POUNDS OF SEED MIX PER 1000 SQUARE FEET
   3. 2.5 GALLONS OF ORGANIC TACKIFIER.
   4. 92 GALLONS OF WATER (MINIMUM).
F. THE WOOD FIBER MULCH, SEED, TACKIFIER AND WATER SHALL BE MIXED TOGETHER IN A HYDRO SEEDING MACHINE HAVING A CAPACITY OF AT LEAST 2,000 GALLONS TO ALLOW FOR A HOMOGENEOUS SLURRY WHICH IS THOROUGHLY MIXED AND CAN BE APPLIED EASILY WITHOUT CLOGGING. THE MACHINE SHALL BE MOUNTED ON A TRAVELING UNIT WHICH IS EITHER SELF−PROPELLED OR DRAWN BY A SEPARATE UNIT. EQUIPMENT USED IN THE HYDRO SEEDING PROCESS WILL BE THOROUGHLY CLEANED OF ALL SEED AND OTHER MATERIALS USED IN ANY PREVIOUS HYDRO SEEDING PROCESS, PRIOR TO HYDRO SEEDING ON THIS PROJECT.
G. THE EQUIPMENT SHALL HAVE A BUILT−IN AGITATION SYSTEM AND OPERATING CAPACITY SUFFICIENT TO AGITATE, SUSPEND AND HOMOGENEOUSLY MIX A SLURRY CONTAINING NOT LESS THAN 44 LBS. OF ORGANIC MULCHING AMENDMENT PLUS CHEMICAL ADDITIVES AND SOLIDS FOR EACH 100 GALLONS OF WATER.
H. THE SLURRY SHALL BE PREPARED AT THE SITE AND ITS COMPONENTS SHALL BE MIXED TO SUPPLY THE RATES OF APPLICATION AS SPECIFIED. SLURRY PREPARATION SHALL BEGIN BY ADDING WATER TO THE TANK WHEN THE ENGINE IS AT ½ THROTTLE. THE ENGINE THROTTLE SHALL BE OPEN TO FULL SPEED WHEN THE TANK IS ½ FILLED WITH WATER. ALL ORGANIC AMENDMENTS, FIBER AND CHEMICALS SHALL THEN BE ADDED BY THE TIME THE TANK IS 2/3 TO 3/4 FULL. AT THIS TIME, SEED MIX SHALL ALSO BE ADDED AND NOT BEFORE THIS TIME. SPRAYING SHALL COMMENCE IMMEDIATELY WHEN THE TANK IS FULL AND THE SLURRY IS MIXED.
I. APPLY HYDROSEED TO FORM EVEN APPEARING COVER OVER REQUIRED AREAS. THE SLURRY SHALL BE APPLIED IN A DOWNWARD DRILLING MOTION VIA A FAN STREAM NOZZLE. IT IS IMPORTANT TO ENSURE THAT ALL OF THE COMPONENTS ENTER AND MIX WITH THE SOIL. USE ONLY QUALIFIED AND TRAINED PERSONNEL TO ENSURE UNIFORMITY OF THE HYDROSEED APPLICATION.
J. THE HYDRO SEEDING SLURRY COMPONENTS SHALL NOT BE LEFT IN THE HYDROSEED MACHINE FOR MORE THAN 2 HOURS IN ORDER TO AVOID SEED DETERIORATION.

6. CONTRACTOR SHALL HAVE THE LANDSCAPE ARCHITECT APPROVE PLANT MATERIAL SIZE AND QUALITY PRIOR TO INSTALLATION. ANY PLANTS WHICH ARE NOT TRUE TO FORM, APPEAR STRESSED OR UNHEALTHY, INFESTED WITH PESTS, OR UNDERSIZED FOR THEIR CONTAINERS SHALL BE REJECTED.

7. PLANT MATERIAL SHALL NOT BE ROOT BOUND. FIVE (5) GALLON PLANTS AND LARGER SHALL HAVE BEEN GROWN IN CONTAINERS FOR A MINIMUM OF SIX (6) MONTHS UP TO A MAXIMUM OF TWO (2) YEARS. PLANTS SHALL EXHIBIT HEALTHY GROWTH AND BE FREE OF DISEASES AND PESTS.

8. CONTRACTOR SHALL SPOT THE LOCATIONS OF ALL PLANTS FOR APPROVAL BY THE LANDSCAPE ARCHITECT PRIOR TO INSTALLATION.

9. PLANTS SHALL NOT BE PLACED WITHIN TWELVE (12) INCHES OF SPRINKLER HEADS.

10. PLANT BACKFILL MIX SHALL BE 100% NATIVE SOIL UNLESS OTHERWISE SPECIFIED.

11. PLANTING PROCEDURES FOR ALL PLANT MATERIALS, ESPECIALLY TREES, SHALL BE AS FOLLOWS:
A. DIG PLANTING HOLE TWO (2) TIMES THE WIDTH OF THE ROOT BALL, AND ONE TO TWO (1−2) INCHES SHALLOWER THAN THE ROOT BALL DEPTH. SIDES OF HOLE SHOULD BE ROUGHENED AND NOT SMOOTH OR SCULPTED. FOR CONTAINER PLANTS, REMOVE CONTAINER AND PLACE ROOT BALL IN CENTER OF HOLE, WITH ROOT BALL RESTING ON UNDISTURBED SOIL. ROOT CROWN OR COLLAR SHALL BE AT OR JUST ABOVE FINISHED GRADE.
B. FOR BALLED AND BURLAPPED PLANTS, PLACE ROOT BALL IN CENTER OF HOLE AND RESTING ON UNDISTURBED GROUND. CUT AND REMOVE WIRE BASKET AND BURLAP OR OTHER WRAPPING MATERIAL FROM ROOT BALL. THIS MAY BE DONE WITH ROOT BALL IN HOLE. BURLAP OR WIRE PIECES UNDERNEATH THE ROOT BALL MAY BE LEFT IF THEY CANNOT BE REMOVED. DO NOT FOLD BURLAP OVER, BUT CUT AWAY AS MUCH AS POSSIBLE WITHOUT DISTURBING ROOT BALL. BACKFILL BOTTOM THIRD (1/3) OF HOLE AS WIRE AND BURLAP ARE REMOVED.
C. BACKFILL WITH SPECIFIED SOIL MIX, FILLING HOLE TO TWO THIRDS (2/3) CAPACITY. THOROUGHLY WATER PLANT, THEN COMPLETE BACKFILLING THE HOLE. FORM A WATERING BASIN AROUND THE PLANT AND THOROUGHLY WATER AGAIN. MONITOR ALL PLANTS TO INSURE THAT NO SETTLING OCCURS.

12. AFTER PLANTING, THE FOLLOWING OPERATIONS SHALL BE PERFORMED:
A. STAKE ALL TREES PER INSTALLATION DETAILS.
B. REMOVE NURSERY STAKES AND TIES FROM ALL CONTAINER STOCK. MAINTAIN SIDE GROWTH ON ALL TREES. PRUNE AND REMOVE ANY DEAD, DAMAGED OR BROKEN BRANCHES.

13. THE LANDSCAPE CONTRACTOR SHALL LEAVE SITE IN A CLEAN CONDITION, REMOVING ALL UNUSED MATERIAL, TRASH AND TOOLS.

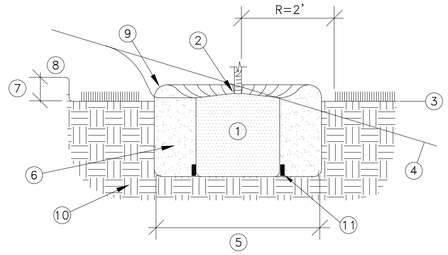
14. AT COMPLETION OF ALL WORK OUTLINED IN THESE PLANS, THE LANDSCAPE CONTRACTOR SHALL CONTACT OWNER AND ARRANGE FOR A WALK THROUGH TO VERIFY THAT ALL ASPECTS OF WORK HAVE BEEN COMPLETED. WORK MUST BE FULLY COMPLETED ACCORDING TO ALL PLANS, NOTES, AND SPECIFICATIONS AND EXHIBIT PROFESSIONAL WORKMANSHIP. A MAINTENANCE PERIOD WILL BEGIN ON THE DATE OF ACCEPTANCE BY OWNER.

15. LANDSCAPE CONTRACTOR SHALL MAINTAIN ALL PLANTINGS FOR A MINIMUM PERIOD OF NINETY (90) DAYS. THE MAINTENANCE WORK REQUIRED SHALL INCLUDE BUT NOT BE LIMITED TO THE FOLLOWING:
A. DAILY WATERING OF ALL PLANT MATERIAL.
B. WEEDING AND REMOVAL OF ALL WEEDS FROM GROUND COVER AND PLANTING AREAS.
C. REPLACEMENT OF ANY DEAD, DYING, OR DAMAGED TREES, SHRUBS OR GROUNDCOVER.
D. FILLING AND REPLANTING OF ANY LOW AREAS WHICH MAY CAUSE STANDING WATER.
E. ADJUSTING OF SPRINKLER HEAD HEIGHTS AND WATERING PATTERNS.
F. FILLING AND RECOMPACTION OF ERODED AREAS, ALONG WITH ANY REQUIRED RE−SEEDING AND/OR RE−PLANTING.
G. WEEKLY REMOVAL OF ALL TRASH, LITTER, CLIPPINGS AND ALL FOREIGN DEBRIS.
H. AT 10−14 DAYS AFTER PLANTING, A 21−7−14 FERTILIZER SHALL BE APPLIED TO GRASS AREAS AT A RATE OF THREE POUNDS PER 1000 SQUARE FEET (PER MANUFACTURER'S RECOMMENDATIONS).
I. AT THIRTY (30) DAYS AFTER PLANTING APPLY 20−6−10 FERTILIZER TO GRASS AREAS AT A RATE OF THREE TO FOUR POUNDS OF PER 1000 SQUARE FEET (PER MANUFACTURER'S RECOMMENDATIONS).

16. PRIOR TO END OF MAINTENANCE PERIOD, LANDSCAPE CONTRACTOR SHALL CONTACT OWNER AND ARRANGE FOR A FINAL WALK THROUGH BEFORE FINAL ACCEPTANCE. OWNER MUST ACCEPT ALL MAINTAINED AREAS IN WRITING PRIOR TO END OF MAINTENANCE PERIOD.

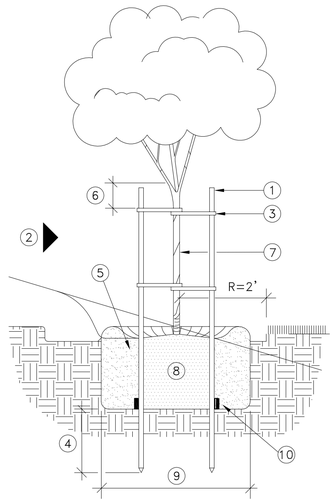
17. LANDSCAPE CONTRACTOR SHALL GUARANTEE PLANT MATERIALS AS FOLLOWS:
A. ALL SHRUBS AND GROUND COVERS SHALL BE GUARANTEED BY THE CONTRACTOR AS TO GROWTH AND HEALTH FOR A PERIOD OF SIXTY (60) DAYS AFTER COMPLETION OF THE MAINTENANCE PERIOD AND FINAL ACCEPTANCE. ALL TREES SHALL BE GUARANTEED BY THE CONTRACTOR TO LIVE AND GROW IN AN ACCEPTABLE UPRIGHT POSITION FOR A PERIOD OF ONE (1) YEAR AFTER COMPLETION OF THE SPECIFIED MAINTENANCE PERIOD AND FINAL ACCEPTANCE.
B. THE CONTRACTOR , WITHIN FIFTEEN (15) DAYS AFTER RECEIVING WRITTEN NOTIFICATION BY THE ARCHITECT, SHALL REMOVE AND REPLACE ALL GUARANTEED PLANT MATERIALS WHICH FOR ANY REASON FAIL TO MEET THE REQUIREMENTS OF THE GUARANTEE. REPLACEMENT SHALL BE MADE WITH PLANT MATERIALS AS INDICATED OR SPECIFIED ON THE ORIGINAL PLANS, AND ALL SUCH REPLACEMENT MATERIALS SHALL BE GUARANTEED AS SPECIFIED FOR THE ORIGINAL MATERIALS.

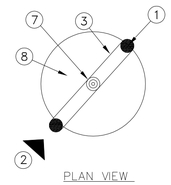
18. AGRIFORM FERTILIZER TABLETS (21 GRAM) OR PRE−APPROVED EQUAL SHALL BE ADDED TO EACH PLANT AT THE TIME OF ITS INSTALLATION BY PLACING THE TABLET ON THE BOTTOM OF THE PLANTING PIT (UPHILL SIDE) PRIOR TO INSTALLING THE PLANT. THE NUMBER OF PLANTS USED SHALL BE: 1 GAL= 1 TABLET; 5 GAL= 2 TABLETS; 2" CAL.= 5 TABLETS.



1. ROOTBALL
2. CROWN – 6" ABOVE FINISH GRADE
3. FINISH GRADE
4. FINISH GRADE AT SLOPE (WHERE OCCURS)
5. 2x ROOTBALL DIA. MIN.
6. BACKFILL MIX (SEE NOTES)
7. 2"
8. TOP OF PAVING
9. 3" HIGH WATERING BASIN
10. UNDISTURBED OR 90% COMPACTED SOIL
11. FERTILIZER TABLETS SEE NOTE #24

B TREE/SHRUB PLANTING DETAIL
NTS

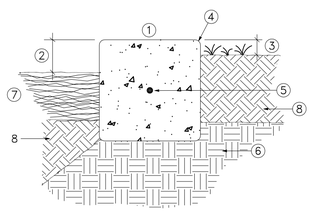




PLAN VIEW

1. 2" DIA. x 10' STRAIGHT WOODEN STAKE (2 REQUIRED)
2. PREVAILING WIND DIRECTION
3. V.I.T. CINCH−TIE VINYL TREE TIE (2 PER STAKE, LENGTH AS REQ'D). SECURE TO STAKE W/GALV. NAIL, 1 PER TIE
4. 24" MIN.
5. SEE TREE/SHRUB PLANTING DETAIL
6. 6" MAX.
7. TREE TRUNK
8. ROOTBALL
9. 2x ROOTBALL DIA. MIN.
10. FERTILIZER TABLETS−SEE NOTES

C DOUBLE TREE STAKING
NTS



1. 6 INCH SQUARE CONCRETE MOW STRIP (MIN 2500 PSI AT 28 DAYS)
2. FINISH GRADE AT 2" FOR GROUNDCOVER AREAS
3. FINISH GRADE FOR LAWN AREAS: 1" FOR SEED; 1 1/2" FOR SOD
4. 1/2" RADIUS TROWELED EDGES (TYP.)
5. #3 REBAR CONT. (LAP 12" AT SPLICES)
6. UNDISTURBED OR 90% COMPACTED SUBGRADE
7. 3" LAYER SHREDDED BARK MULCH IN PLANTER BEDS
8. TOPSOIL – 4" IN TURF, 12" IN PLANTING BEDS

NOTE: PROVIDE CONSTRUCTION OR CONTROL JOINTS AT 5' O.C. MAX. AND EXPANSION JOINTS WHERE MOWSTRIP ABUTS ANY MASONRY TYPE IMPROVEMENT.

A CONCRETE MOWSTRIP
NTS

STATE OF UTAH
GREGORY H. GRAVES
104416
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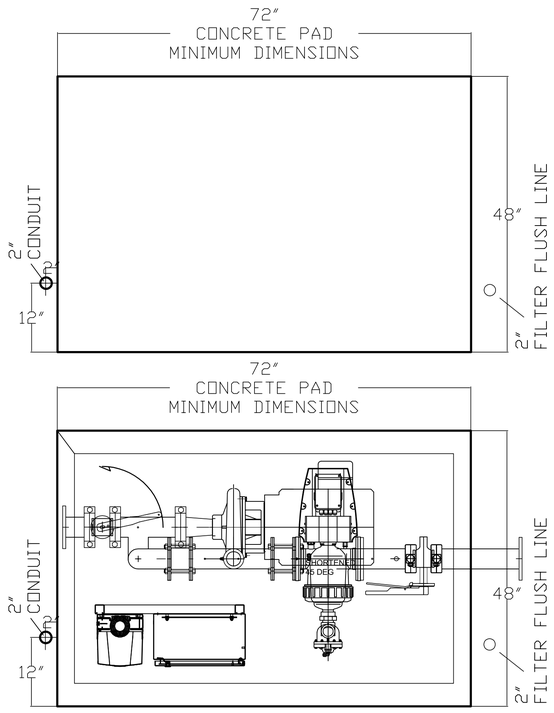
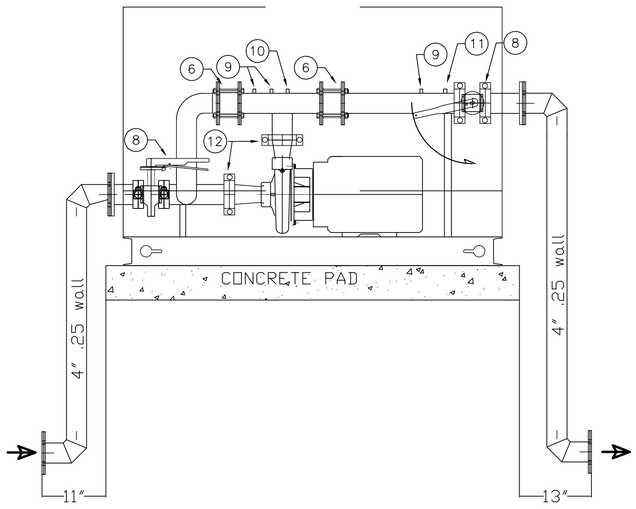
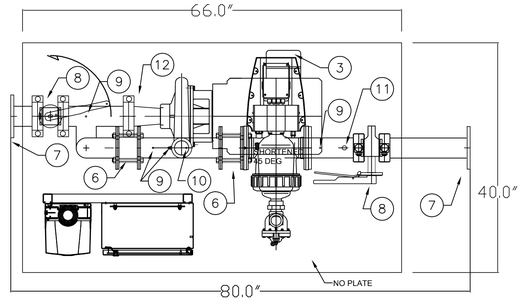
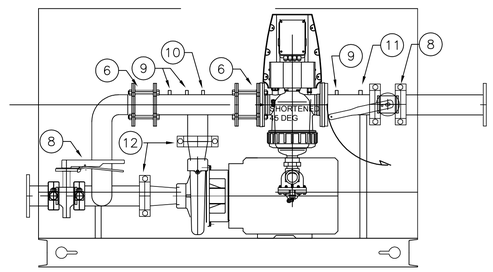
NOTES

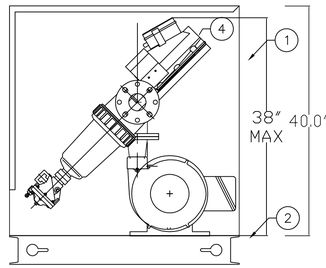
CONTRACTOR SHALL INCLUDE MANUFACTURER'S CERTIFIED PUMP SETUP AND CALIBRATION AND Z-DROPS AS A PART OF THE PUMP ASSEMBLY COST.







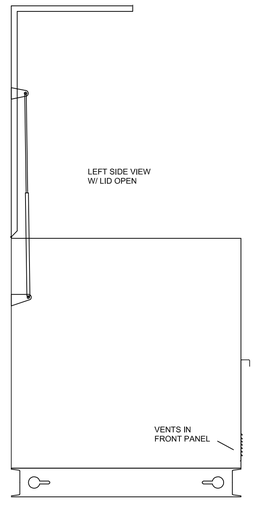


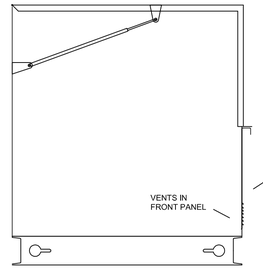


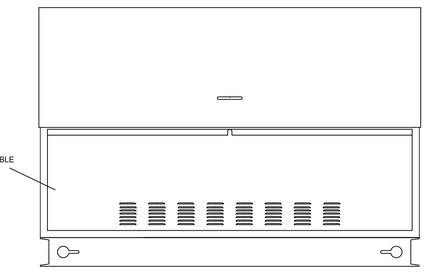
PRECISION PUMPING SYSTEMS
ENCLOSED PUMPING STATION

MODEL VBOOST-1C5-NJ-0-200-TF
PERFORMANCE: 40 GPM @ 35 PSI BOOST
MAIN PUMP(S): (ea.) hp. MINIMUM

LEGEND
1. PUMP STATION ENCLOSURE
2. PUMP SKID
3. CENTRIFUGAL PUMP
4. AMIAD 3" TAF750E FILTER
5. PRESSURE TANK (IF EQUIPPED)
6. 3" SILENT CHECK VALVE
7. 3" FLANGE
8. 3" BUTTERFLY VALVE - VICTAULIC
9. 1/4" HC
10. 1/4" HC AIR RELIEF VALVE
11. 3/4' HC FLOW SWITCH
12. VICTAULIC COUPLER







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SYMBOL LEGEND

SYMBOL	DESCRIPTION
REFERENCE AND LINE SYMBOLS	
⟨1⟩	KEYNOTE INDICATOR.
1	REVISION INDICATOR.
⟨CU-1⟩	EQUIPMENT INDICATOR.
	BREAK, STRAIGHT: TO BREAK PARTS OF DRAWING.
	BREAK, ROUND.
MATCH LINE / SEE XX/X-XXX	MATCH LINE INDICATOR: CENTER, EXTRA WIDE LINE.
	NEW LINE: MEDIUM LINE.
	HIDDEN FEATURES LINE: HIDDEN, THIN LINE.
	EXISTING TO REMAIN LINE: THIN LINE.
	DEMOLITION LINE: DASHED, MEDIUM LINE.
	PROPERTY LINE: DASHED, WIDE LINE.
	CONTRACT LIMIT LINE: DASHDOT, WIDE LINE.
WIRING DEVICES	
	RECEPTACLE, SINGLE: NEMA 5-20R.
	RECEPTACLE, DUPLEX: NEMA 5-20R.
IG	RECEPTACLE, DUPLEX, ISOLATED GROUND: NEMA 5-20R.
W	RECEPTACLE, DUPLEX WITH GROUND FAULT CIRCUIT INTERRUPTER, WET LABEL, "WEATHERPROOF IN USE": NEMA 5-20R.
WP	RECEPTACLE, DUPLEX, WEATHERPROOF: NEMA 5-20R.
	RECEPTACLE, DUPLEX WITH GROUND FAULT CIRCUIT INTERRUPTER: NEMA 5-20R.
WP	RECEPTACLE, DUPLEX WITH GROUND FAULT CIRCUIT INTERRUPTER, WEATHERPROOF: NEMA 5-20R.
ELECTRICAL POWER AND DISTRIBUTION	
	DISCONNECT SWITCH, FUSED OR UNFUSED. SEE EQUIPMENT SCHEDULE.

ELECTRICAL SHEET INDEX

DEFINITIONS

NOTE: ALL DEFINITIONS MAY NOT BE USED.

INDICATED: THE TERM "INDICATED" REFERS TO GRAPHIC REPRESENTATIONS, NOTES, OR SCHEDULES ON THE DRAWINGS, OTHER PARAGRAPHS OR SCHEDULES IN THE SPECIFICATIONS, AND SIMILAR REQUIREMENTS IN THE CONTRACT DOCUMENTS. WHERE TERMS SUCH AS "SHOWN", "NOTED", "SCHEDULED", AND "SPECIFIED" ARE USED, IT IS TO HELP THE READER LOCATE THE REFERENCE, NO LIMITATION ON LOCATION IS INTENDED.

DIRECTED: TERMS SUCH AS "DIRECTED", "REQUESTED", AUTHORIZED", "SELECTED", "APPROVED", "REQUIRED", AND "PERMITTED" MEAN "DIRECTED BY THE ENGINEER", "REQUESTED BY THE ENGINEER", AND SIMILAR PHRASES.

APPROVE: THE TERM "APPROVED", WHERE USED IN CONJUNCTION WITH THE ENGINEER'S ACTION ON THE CONTRACTOR'S SUBMITTALS, APPLICATIONS, AND REQUESTS, IS LIMITED TO THE ENGINEER'S DUTIES AND RESPONSIBILITIES AS STATED IN GENERAL AND SUPPLEMENTARY CONDITIONS.

FURNISH: THE TERM "FURNISH" IS USED TO MEAN "SUPPLY AND DELIVER TO THE PROJECT SITE, READY FOR UNLOADING, UNPACKING, ASSEMBLY, INSTALLATION, AND SIMILAR OPERATIONS."

INSTALL: THE TERM "INSTALL" IS USED TO DESCRIBE OPERATIONS AT PROJECT SITE INCLUDING THE ACTUAL "UNLOADING, UNPACKING, ASSEMBLY, ERECTION, PLACING, ANCHORING, APPLYING, WORKING TO DIMENSION, FINISHING, CURING, PROTECTING, CLEANING, AND SIMILAR OPERATIONS."

PROVIDE: THE TERM "PROVIDE" MEANS "TO FURNISH AND INSTALL, COMPLETE AND READY FOR THE INTENDED USE."

INSTALLER: AN "INSTALLER" IS THE CONTRACTOR OR AN ENTITY ENGAGED BY THE CONTRACTOR, EITHER AS AN EMPLOYEE, SUBCONTRACTOR, OR SUB-SUBCONTRACTOR, FOR PERFORMANCE OF A PARTICULAR CONSTRUCTION ACTIVITY, INCLUDING INSTALLATION, ERECTION, APPLICATION, AND SIMILAR OPERATIONS. INSTALLERS ARE REQUIRED TO BE EXPERIENCED IN THE OPERATIONS THEY ARE ENGAGED TO PERFORM.

ABBREVIATIONS

NOTE: ALL ABBREVIATIONS MAY NOT BE USED.

1P	SINGLE POLE
1PH	SINGLE-PHASE
1WAY	ONE-WAY
2/C	TWO-CONDUCTOR
2WAY	TWO-WAY
3/C	THREE-CONDUCTOR
3PH	THREE-PHASE
3WAY	THREE-WAY
4OUT	QUADRUPLE RECEPTACLE OUTLET
4PDT	FOUR-POLE DOUBLE THROW
4PST	FOUR-POLE SINGLE THROW
4W	FOUR-WIRE
4WAY	FOUR-WAY
AC	ARMORED CABLE
ADA	AMERICANS WITH DISABILITIES ACT
ADJ	ADJACENT
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AIC	AMPERE INTERRUPTING CAPACITY
ALUM	ALUMINUM
AMP	AMPERE
ANN	ANNUNCIATOR
AR	AS REQUIRED
ASC	AMPS SHORT CIRCUIT
ATS	AUTOMATIC TRANSFER SWITCH
AV	AUDIO VISUAL
AWG	AMERICAN WIRE GAGE
BB XFMR	BUCK-BOOST TRANSFORMER
CATV	COMMUNITY ANTENNA TELEVISION
CB	CIRCUIT BREAKER
CCBA	CUSTOM COLOR AS SELECTED BY ARCHITECT
CCTV	CLOSED CIRCUIT TELEVISION
CFBA	CUSTOM FINISH AS SELECTED BY ARCHITECT
CF/CI	CONTRACTOR FURNISHED/ CONTRACTOR INSTALLED
CF/OI	CONTRACTOR FURNISHED/ OWNER INSTALLED
CKT	CIRCUIT
CM	CONSTRUCTION MANAGER
CND	CONDUIT
CO	CONVENIENCE OUTLET
COR	CONTRACTING OFFICER'S REPRESENTATIVE
CP	CONTROL PANEL
CT	CURRENT TRANSFORMER
CTV	CABLE TELEVISION
CU	COPPER
dBA	UNIT OF SOUND LEVEL
DPDT	DOUBLE POLE DOUBLE THROW
DS	DISCONNECT SWITCH
EA	EACH
EM	EMERGENCY
EMT	ELECTRICAL METALLIC TUBING
ENT	ELECTRICAL NONMETALLIC TUBING
EPO	EMERGENCY POWER OFF
EQUIP	EQUIPMENT
EXIST	EXISTING
FA	FIRE ALARM
FCP	FIRE ALARM CONTROL PANEL
FLA	FULL LOAD AMPS
FMC	FLEXIBLE METAL CONDUIT
FOB	FREIGHT ON BOARD
FVNR	FULL VOLTAGE NON-REVERSING
FVR	FULL VOLTAGE REVERSING
G	GROUND
GEN	GENERATOR
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GFP	GROUND FAULT PROTECTION
HD	HEAVY DUTY
HID	HIGH INTENSITY DISCHARGE
HOA	HAND-OFF-AUTOMATIC
HP	HORSE POWER
HPF	HIGH POWER FACTOR
HPS	HIGH PRESSURE SODIUM
HV	HIGH VOLTAGE
Hz	HERTZ
IG	ISOLATED GROUND
IMC	INTERMEDIATE METAL CONDUIT
IN/IS	INSULATED/ISOLATED
I/O	INPUT/OUTPUT
IR	INFRARED
kV	KILOVOLT
kVA	KILOVOLT AMPERE
kVAR	KILOVOLT AMPERE REACTIVE
kW	KILOWATT
kWh	KILOWATT HOUR
LED	LIGHT EMITTING DIODE
LFMC	LIQUID TIGHT FLEXIBLE METAL CONDUIT
LFNC	LIQUID TIGHT FLEXIBLE NONMETALLIC CONDUIT
LPS	LOW PRESSURE SODIUM
LRA	LOCKED ROTOR AMPS
LTG	LIGHTING
LV	LOW VOLTAGE
MATV	MASTER ANTENNA TELEVISION SYSTEM
MAX	MAXIMUM
MC	METAL CLAD
MCA	MINIMUM CIRCUIT AMPS
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MCP	MOTOR CIRCUIT PROTECTION
MDP	MAIN DISTRIBUTION PANEL
MG	MOTOR GENERATOR
MH	MANHOLE
MIN	MINIMUM
MLO	MAIN LUGS ONLY
MOCP	MAXIMUM OVERCURRENT PROTECTION
NA	NOT APPLICABLE
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRICAL CODE
NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
NFC	NATIONAL FIRE CODE
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NIC	NOT IN CONTRACT
NL	NIGHT LIGHT
NO	NORMALLY OPEN
NTS	NOT TO SCALE
OC	ON CENTER
OCP	OVER CURRENT PROTECTION
OF/CI	OWNER FURNISHED/ CONTRACTOR INSTALLED
OF/OI	OWNER FURNISHED/ OWNER INSTALLED
OFP	OBTAIN FROM PLANS
OH DR	OVERHEAD (COILING) DOOR
OL	OVERLOAD
PB	PUSHBUTTON
PF	POWER FACTOR
PH	PHASE
PNL	PANEL
PT	POTENTIAL TRANSFORMER
QTY	QUANTITY
R	REMOVE
RCP	REFLECTED CEILING PLAN
RMC	RIGID METAL CONDUIT
RNC	RIGID NONMETALLIC CONDUIT
RPM	REVOLUTIONS PER MINUTE
RR	REMOVE AND RELOCATE
SCA	SHORT CIRCUIT AMPS
SCBA	STANDARD COLOR AS SELECTED BY ARCHITECT
SF	SQUARE FOOT (FEET)
SFBA	STANDARD FINISH AS SELECTED BY ARCHITECT
SPDT	SINGLE POLE, DOUBLE THROW
SPEC	SPECIFICATION
SPST	SINGLE POLE, SINGLE THROW
S/S	START/STOP
ST	SINGLE THROW
SWBD	SWITCHBOARD
SWGR	SWITCHGEAR
TL	TWIST LOCK
TP	TELEPHONE POLE
TP	TWISTED PAIR
TTB	TELEPHONE TERMINAL BOARD
TV	TELEVISION
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSER
TYP	TYPICAL
UF	UNDERFLOOR
UGND	UNDERGROUND
UPS	UNINTERRUPTIBLE POWER SUPPLY
V	VOLTS
VA	VOLT AMPERE
VFC	VARIABLE FREQUENCY CONTROLLER
W/	WITH
W/O	WITHOUT
WP	WEATHERPROOF
XFMR	TRANSFORMER

GENERAL SHEET NOTES

1. CLARIFICATION METHODS: AT THE TIME OF BIDDING, BIDDERS SHALL FAMILIARIZE THEMSELVES WITH THE DRAWINGS AND SPECIFICATIONS. ANY QUESTIONS, MISUNDERSTANDINGS, CONFLICTS, DELETIONS, DISCONTINUED PRODUCTS, CATALOG NUMBER DISCREPANCIES, DISCREPANCIES BETWEEN THE EQUIPMENT SUPPLIED AND THE INTENT OR FUNCTION OF THE EQUIPMENT, ETC, SHALL BE SUBMITTED TO THE ARCHITECT/ENGINEER IN WRITING FOR CLARIFICATION PRIOR TO ISSUANCE OF THE FINAL ADDENDUM AND BIDDING OF THE PROJECT. WHERE DISCREPANCIES OR MULTIPLE INTERPRETATIONS OCCUR, THE MOST STRINGENT (WHICH IS GENERALLY RECOGNIZED AS THE MOST COSTLY) THAT MEETS THE INTENT OF THE DOCUMENTS SHALL BE ENFORCED.

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LICENSED PROFESSIONAL ENGINEER
No. 181563
DAVID E. WESEMANN
STATE OF UTAH

Rev.	By	Date	Remarks
1	GHG	5/18/07	ISSUED FOR BID (REVISED)
0	GHG	3/22/07	ISSUED FOR BID

SYMBL LEGEND AND INDEX SHEET

BINGHAM ENGINEERING
SALT LAKE CITY - (801) 532-2520
OGDEN - (801) 399-1662

Dsn: SRB
Drw: WJS
Chk: SRB
Rvw: TLT

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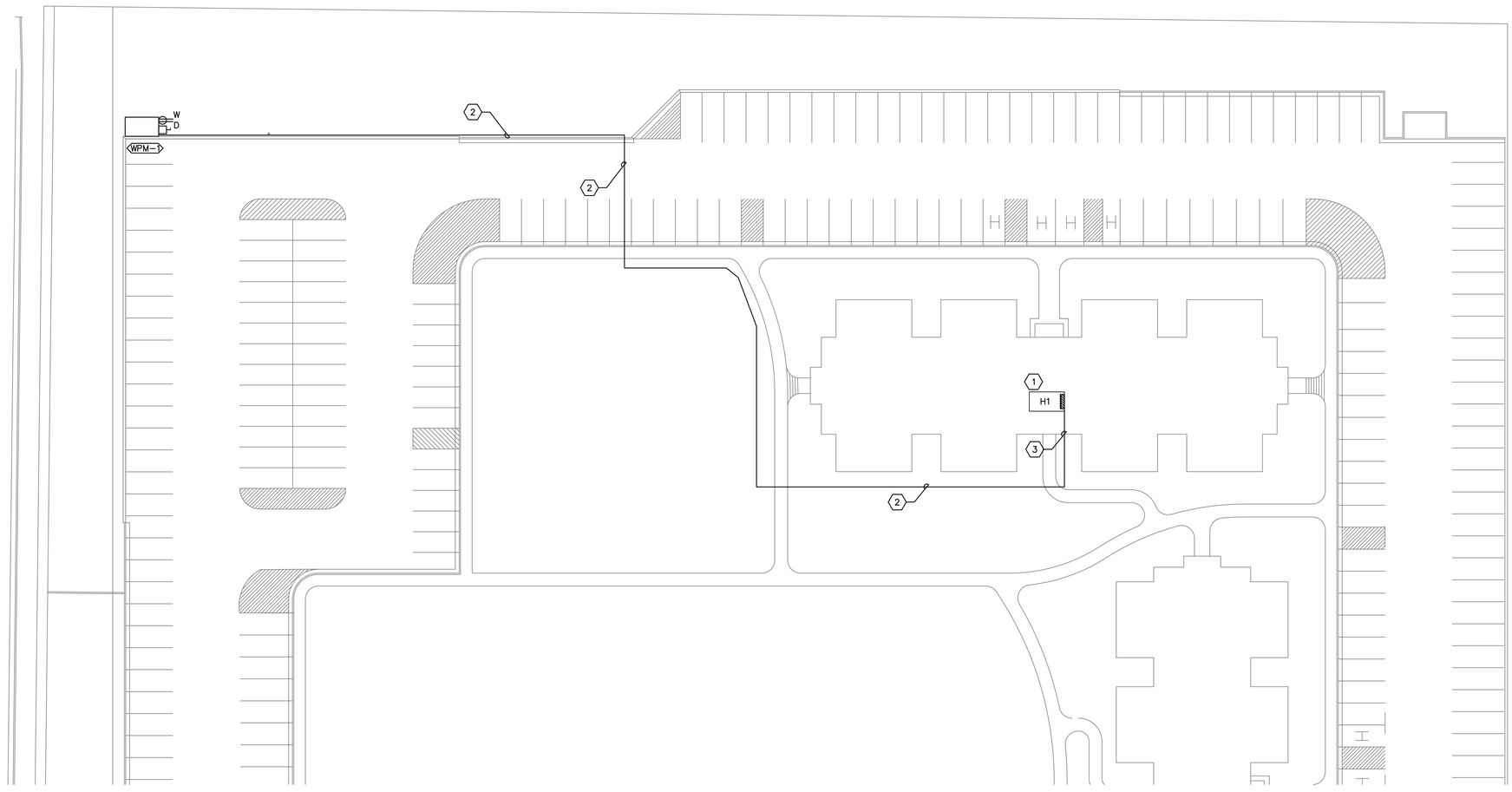

GENERAL SHEET NOTES

1. VERIFY AND COORDINATE WITH EXISTING UNDERGROUND UTILITIES BEFORE TRENCHING.
2. THE CONTRACTOR SHALL BE REQUIRED TO COMPACT THE TRENCHES USING SPECIFIC EQUIPMENT THAT CAN COMPACT THE NARROW TRENCHES AND ACHIEVE A MINIMUM OF 105 PERCENT RELATIVE COMPACTION PER ASTM D-1557. JETTING IS NOT ALLOWED. THE TRENCH BACK FILL SHALL BE PLACED IN THIN LIFTS NOT TO EXCEED 4 INCHES IN THICKNESS IN THE NARROW TRENCHES. THE MOISTURE CONTENT SHALL RANGE FROM OPTIMUM TO 3 PERCENT ABOVE OPTIMUM MOISTURE CONTENT AT TIME PLACEMENT. THE BACK FILL MATERIAL SHALL CONFORM WITH THE ENGINEERED FILL REQUIREMENTS IN THE PROJECT GEOTECHNICAL ENGINEERING REPORT, THE REQUIREMENTS OF THE PIPE MANUFACTURER, AND THE PROJECT SPECIFICATIONS, WHICHEVER IS MORE STRINGENT.

SHEET KEYNOTES

1. EXISTING HOUSE PANEL LOCATED ON SECOND FLOOR ADJACENT TO ELEVATOR.
2. 24" TRENCH FOR 1.25" CND. PULL 3 #10 FOR DEDICATED OUTLET AND PULL 5 #6 FOR WPM-1
3. CORE DRILL FOR CONDUIT. PROVIDE RAINTIGHT SEAL AFTER CONDUIT IS PROVIDED.

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ELECTRICAL SITE PLAN

BINGHAM ENGINEERING
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EQUIPMENT SCHEDULE

MARK	QTY	ITEM DESCRIPTION	LOAD DATA							WIRE AND CONDUIT SIZE	OVERCURRENT PROTECTION			DISCONNECT			STARTER DATA														NOTES	MARK
			HP	kW	MCA	FLA	VOLT	PH	Hz		FURN BY	DEVICE	LOCATION	FURN BY	DEVICE	LOCATION	FURN BY	DEVICE	LOCATION	SIZE	SPEED	CTRL VOLT	SELECTOR SWITCH	PUSH BUTTON	PILOT LAMP	NORMALLY OPEN CONTACTS	NORMALLY CLOSED CONTACTS	PHASE FAILURE RELAY	SCHEMATIC REFERENCE	REMOTE CTRL		
WPM–1		WATER PUMP	5			17.5	208	3	60	CC6	E	30A/3P CB	PANEL	E	30A3P3F FRN–R–20	PANEL															5	WPM–1

NOTES
1 FOR MOTORS LESS THAN 1 HP, IF MOTOR NAMEPLATE SHOWS THE MOTOR TO BE THERMALLY PROTECTED, A DISCONNECT MAY BE SUBSTITUTED FOR THE THERMAL SWITCH.
2 CONTROL FAN WITH REST ROOM LIGHT SWITCH.
3 PROVIDE SMOKE DETECTOR IN DUCT WORK AND RELAY TO SHUT DOWN RTU. PROVIDE HORN STROBE TO ALARM ON SMOKE DETECTION, MOUNTED IN CONTINUOUSLY OCCUPIED SPACE. COORDINATE LOCATION OF HORN STROBE WITH TENANT.
4 IF WATER HEATER COMES WITH A CONTROL SWITCH THAT DISCONNECTS ALL POWER, THE LOCAL DISCONNECT CAN BE OMITTED.
5 PROVIDE FUSE MATCHED TO MCA OR INSTALLED RTU.

PANEL "H" (Existing)

VOLTS/PHASE/WIRE:	PANEL SIZE & TYPE:	MAIN SIZE & TYPE:	LOCATION:	CABINET:	NOTES:
120/208 V, 3 PH 4 WIRE	22" W x 6" D, BOLT–ON	400 AMPERE MAIN XXX	Building 5		

ACCESSORIES: PANEL DIRECTORY, IDENTIFICATION, GROUNDING BAR, INSULATED GROUND BAR, SUBFEED LUGS

CKT	OCP		LOAD (kVA)			DESCRIPTION	LCL	PHASE LOAD			LCL	DESCRIPTION	LOAD (kVA)			OCP		CKT
NO	AMP	POLE	LTG	CO	PWR		kVA	A	B	C	kVA		LTG	CO	PWR	AMP	POLE	NO
1	20	1		0.9		1ST FLOOR OUTLETS	0.9	11.1			10.2	ELEVATOR			10.2	175	3	2
3	20	1		1.08		1ST FLOOR OUTLETS	1.1		11.3		10.2	–			10.2	–	–	4
5	20	1	0.12	0.18		ELEVATOR PIT	0.3			10.5	10.2	–			10.2	–	–	6
7	20	1				SPARE	0.0	0.4			0.5	MAIN FLR EMERG LTG	0.39			20	1	8
9	20	1			0.2	ELEVATOR CAR	0.2		0.7		0.6	MAIN FLR CORR LTG	0.455			20	1	10
11	20	1	0.07	0.18		ELEVATOR EQIP RM	0.3			0.6	0.5	2ND FLR EMERG LTG	0.392			20	1	12
13	20	1	0.11			1ST FLOOR EXITS	0.1	0.7			0.7	2ND FLR CORR LTG	0.585			20	1	14
15	20	1	0.392			ERD FLR EMERG CORR	0.5		1.1		0.9	ATTIC LTG	0.7			20	1	16
17	20	1	0.585			3RD FLR EMERG LTGS	0.7			1.9	1.7	EXTERIOR LTG	1.35			20	1	18
19	20	1			0.18	ELEV FSD	0.2	1.5			1.7	EXTERIOR LTG	1.35			20	1	20
21	20	1		0.36		TELECOM RM OUTLET	0.4		3.0		2.6	FC–3			2.6	30	2	22
23	20	1		0.36		TELECOM RM OUTLET	0.4			3.0	2.6	–			2.6	–	–	24
25	20	1		0.36		TELECOM RM OUTLET	0.4	3.0			2.6	FC–4			2.6	30	2	26
27	20	1		0.36		TELECOM RM OUTLET	0.4		3.0		2.6	–			2.6	–	–	28
29	20	1			0.18	THIRD FLOOR RH–1	0.2			2.3	2.1	ECH–2			2.1	30	2	30
31	40	2			2.5	FC–3	2.5	4.6			2.1	–			2.1	–	–	32
33	–	–			2.5	–	2.5		4.6		2.1	ECH–2			2.1	20	1	34
35	50	2			3.5	ECH–1	3.5			5.6	2.1				2.1	20	1	36
37	–	–			3.5	–	3.5	5.7			2.8	PARKING LTG	2.202			30	3	38
39	50	2			3.5	ECH–1	3.5		5.7		2.8	–	2.202			–	–	40
41	–	–			3.5	–	3.5			5.7	2.8	–	2.202			–	–	42
43	30	2			1.1	CU–2	1.1	1.3			0.2	EMERG TELEPHONE		0.18		20	1	44
45	–	–			1.1	–	1.1		1.3		0.2	EMERG TELEPHONE		0.18		20	1	46
47	30	–			1.1	CU–3	1.1			1.3	0.2	EMERG TELEPHONE		0.18		20	1	48
49	–	–			1.1	–	1.1	1.3			0.2	FIRE ALARM PANEL			0.18	20	1	50
51	20	1		0.9		EXTERIROR OUTLETS	0.9		1.3		0.5	STAIRWELL LTG	0.39			20	1	52
53	20	1		0.9		EXTERIOR OUTLETS	0.9			1.3	0.5	STAIRWELL LTG	0.39			20	1	54
55	20	1		0.9		2ND FLR OUTLETS	0.9	1.1			0.2	FUTURE HEAT TAPE		0.18		20	1	56
57	20	1		0.9		3RD FLR OUTLETS	0.9		1.1		0.2	FUTURE HEAT TAPE		0.18		20	1	58
59	20	1		0.9		3RD FLR OUTLETS	0.9			1.1	0.2	FUTURE HEAT TAPE		0.18		20	1	60
61	20	1		0.9		3RD FLR OUTLETS	0.9	1.1			0.2	ATTIC OUTLET		0.18		20	1	62
63	20	1			0.18	EMERG TELEPHONE	0.2		0.4		0.2	SEC PANEL			0.18	20	1	64
65	20	1			0.18	EMERG TELEPHONE	0.2			0.4	0.2	ELEC RM OUTLET		0.18		20	1	66
67	20	1				SPARE	0.0	2.1			2.1	WPM–1			2.1	30	3	68*
69	20	1				SPARE	0.0		2.1		2.1	–			2.1	–	–	70*
71	20	1				SPARE	0.0			2.1	2.1	–			2.1	–	–	72*
73	20	1				SPARE	0.0	0.2			0.2	WPM–1 OUTLET		0.18		20	1	74*
75	20	1				SPACE	0.0		0.0		0.0	SPACE				20	1	76
77	20	1				SPACE	0.0			0.0	0.0	SPACE				20	1	78
79	20	1				SPACE	0.0	0.0			0.0	SPACE				20	1	80
81	20	1				SPACE	0.0		0.0		0.0	SPACE				20	1	82
83	20	1				SPACE	0.0			0.0	0.0	SPACE				20	1	84

TOTALS: CONNECTED kVA PER PHASE **34** **35** **36** CONNECTED TOTAL kVA **105**
CONNECTED AMPS PER PHASE **283** **295** **298** CONNECTED AVERAGE AMPS PER PHASE **292**

NEC DIVERSIFIED LOAD CALCULATIONS
LIGHTING 14kVA @125% = **17** kVA ALL OTHER LOADS @100% = **80** kVA DIVERSIFIED TOTAL kVA = **108**
RECEPTACLES 10kVA @100% = **10** kVA 25% OF LARGEST MOTOR = **0** kVA AVERAGE AMPS PER PHASE = **300**
REMAINDER 1kVA @ 50% = **0** kVA

* NEW CIRCUIT BREAKERS FOR NEW CIRCUITS. ALL OTHER CIRCUITS SHOWN ARE EXISTING.

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PANEL AND EQUIPMENT SCHEDULES

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Sht E3 of 1

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SECTION 16050 – BASIC ELECTRICAL MATERIALS AND METHODS

GENERAL

Materials and installation shall comply with the latest adopted edition of the National Electrical Code, other applicable NFPA sections, state and local codes, and recognized industry standards and practices.

Listing and Labeling: Provide products that are UL listed and labeled.

NEMA Compliance: Comply with construction and installation requirements of applicable NEMA standards.

Prior to submitting bid, visit site to verify all existing conditions and any items that will affect work of this project. Include all costs in bid.

Maintain a set of redlined as–built drawings and deliver to Owner upon completion of project.

Protect adjacent materials indicated to remain. Install and maintain dust and noise barriers to keep dirt, dust, and noise from being transmitted to adjacent areas. Remove protection and barriers after demolition operations are complete.

Locate, identify, and protect electrical services within or passing through demolition area and serving other areas outside the demolition limits. Maintain services to areas outside demolition limits. When services must be interrupted, install temporary services for affected areas.

Coordinate power interruptions one week in advance with Owner. If power interruptions disturb normal operations, then power interruptions are only allowed during non–business or non–operation hours.

Patch and repair surfaces that are disturbed or damaged as a result of electrical installation. Restore surfaces to original condition.

Installation of Fire–Stopping Sealant: Install UL–listed sealant, including forming, packing, and other accessory materials, to fill openings around electrical services penetrating floors and walls, to provide fire–stops with fire–resistance ratings indicated for floor or wall assembly in which penetration occurs. Comply with installation requirements established by testing and inspecting agency.

SECTION 16100 – RACEWAYS, BOXES, AND CABINETS

PRODUCTS

Rigid Steel Conduit: ANSI C80.1.

Intermediate Metal Conduit: ANSI C80.6.

Plastic–Coated Steel Conduit and Fittings: NEMA RN 1.

Plastic–Coated Intermediate Metal Conduit and Fittings: NEMA RN 1.

Electrical Metallic Tubing and Fittings: ANSI C80.3 with set–screw or compression–type fittings. Cast fittings are not allowed.

Flexible Metal Conduit: Zinc–coated steel.

Liquidtight Flexible Metal Conduit: Flexible steel conduit with PVC jacket.

Fittings: NEMA FB 1, compatible with conduit/tubing materials and suitable for use and location.

Rigid Nonmetallic Conduit (RNC): NEMA TC 2, Schedule 40 or 80 PVC.

PVC Conduit and Tubing Fittings: NEMA TC 3; match to conduit or conduit/tubing type and material. Outlet and Device Boxes: Use one of the following:

1. Sheet Metal Boxes: NEMA OS 1.
2. Cast Metal Boxes: NEMA FB 1, type FD, cast feralloy box with gasketed cover.
3. Nonmetallic Boxes: NEMA OS 2.

EXECUTION

Outdoors Wiring Methods: Use the following wiring methods:

1. Exposed: Rigid or intermediate metal conduit.
2. Concealed: Rigid or intermediate metal conduit.
3. Underground: Rigid nonmetallic conduit, except that wrapped rigid metal shall be used for bends greater than 22 degrees.
4. Penetrating Concrete floors and foundations: Wrapped rigid metal conduit.
5. Connection to Vibrating Equipment (including transformers and hydraulic, pneumatic, or electric solenoid or motor–driven equipment): Liquidtight flexible metal conduit.
6. Boxes and Enclosures: NEMA Type 3R or Type 4.

Indoors Wiring Methods: Use the following wiring methods:

1. Connection to Vibrating Equipment, including transformers and hydraulic, pneumatic, or electric solenoid or motor–driven equipment: Flexible metal conduit (maximum of 6 feet), except in wet or damp locations use liquidtight flexible metal conduit.
2. Damp or Wet Locations: Rigid steel conduit.
3. Exposed: Electrical metallic tubing, rigid or intermediate metal conduit where subject to physical damage.
4. Concealed: Electrical metallic tubing.

Conceal conduit and EMT, unless otherwise indicated, within finished walls, ceilings, and floors.

Install raceways level and square and at proper elevations. Run perpendicular and at right angles to building and structural elements. Run parallel or banked raceways together, on common supports where practical. Make bends in parallel or banked runs from same center line to make bends parallel.

Support raceways as follows, in compliance with Division 16 Section "Supporting Devices": Two supports per 10' run, withing 12" of a coupling, fitting or bend greater than 45 degrees, and within 12" of every box to which the raceway is entering or exiting.

Run concealed raceways with a minimum of bends in the shortest practical distance considering the type of building construction and obstructions, except as otherwise indicated.

Raceways Embedded in Slabs: Install in middle third of the slab thickness where practical, and leave at least 1 inch (25 mm) concrete cover.

Joints and terminations: Join raceways with fittings designed and approved for the purpose and make joints and terminations tight.

1. Make raceway terminations tight. Use bonding bushings or wedges at connections subject to vibration.
2. Use bonding jumpers where joints cannot be made tight.
3. Use insulating bushings to protect conductors.

Install pull wires in empty raceways.

Provide grounding connections for raceway, boxes, and components as indicated and instructed by manufacturer. Tighten connectors and terminals, including screws and bolts, according to equipment manufacturer's published torque–tightening values for equipment connectors. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals according to tightening torques specified in UL Standard 486A.

SECTION 16120 – WIRES AND CABLES

PRODUCTS

Wires and Cables: Type THHN/THWN copper conductor.

Solid conductor for 10 AWG and smaller; stranded conductor for larger than 10 AWG.

Connectors and Splices: UL–listed factory–fabricated wiring connectors of size, ampacity rating, material, and type and class for application and for service indicated. Select to comply with Project's installation requirements and as specified in the "Execution" Article.

Color–Coding of Secondary Phase Conductors: Color code switch legs, travelers and other wiring for branch circuits other than those listed below. Permanently post color code at each branch panelboard. Use the following colors for service, feeder and branch–circuit phase conductors:

1. 208/120–V Conductors:
   a. Phase A: Black.
   b. Phase B: Red.
   c. Phase C: Blue.
   d. Neutral: White.
   e. Ground: Green.
   f. Insulated Ground: Green with white stripe.

EXECUTION

Install wires and cables as indicated, according to manufacturer's written instructions and the NECA "Standard of Installation."

Pull conductors into raceway simultaneously where more than one is being installed in same raceway.

Conductor Splices: Keep to minimum.

Install splices and tapes that possess equivalent or better mechanical strength and insulation ratings than conductors being spliced.

Use splice and tap connectors that are compatible with conductor material.

Wiring at Outlets: Install with at least 12 inches (300 mm) of slack conductor at each outlet.

Connect outlets and components to wiring and to ground as indicated and instructed by manufacturer. Tighten connectors and terminals, including screws and bolts, according to equipment manufacturer's published torque–tightening values for equipment connectors. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals according to tightening torques specified in UL Standard 486A.

SECTION 16140 – WIRING DEVICES

PRODUCTS

Wiring Devices: Comply with NEMA Standard WD 1, "General Purpose Wiring Devices."

Color: As selected by Architect/Owner, except as otherwise indicated or required by Code.

Standard Duplex Receptacles: 20A devices; provide nylon or lexan face, back and side wiring. Comply with Federal Specification W–C–596 and heavy–duty grade of UL Standard 498, "Electrical Attachment Plugs and Receptacles." Provide NRTL labeling of devices to verify these compliances.

Ground–Fault Circuit Interrupter (GFCI) Receptacles: UL Standard 943, "Ground Fault Circuit Interrupters," feed–through type, with integral NEMA 5–20R duplex receptacle arranged to protect connected downstream receptacles on the same circuit. Design units for installation in a 2–3/4–inch (70–mm) deep outlet box without an adapter.

Wall Plates: Single and combination types that mate and match with corresponding wiring devices. Features include the following:

1. Color: Matches wiring device except as otherwise indicated.
2. Plate–Securing Screws: Metal with heads colored to match plate finish.
3. Material for Finished Spaces: Lexan or nylon except as otherwise indicated.
4. Material for Unfinished Spaces: Galvanized steel.

EXECUTION

Install devices and assemblies plumb and secure. Protect devices and assemblies during painting and install wall plates when painting is complete.

Arrangement of Devices: Except as otherwise indicated, mount flush, with long dimension vertical, and grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.

SECTION 16190 – SUPPORTING DEVICES

PRODUCTS

Manufactured Supporting Devices:

1. Raceway Supports: Clevis hangers, riser clamps, conduit straps, threaded C–clamps with retainers, ceiling trapeze hangers, wall brackets, and spring steel clamps.
2. Fasteners: Types, materials, and construction features as follows:
   a. Expansion Anchors: Carbon steel wedge or sleeve type.
   b. Toggle Bolts: All steel springhead type.
   c. Powder–Driven Threaded Studs: Heat–treated steel, designed specifically for the intended service.
3. U–Channel Systems: 16–gage steel channels, with 9/16–inch– diameter holes, at a minimum of 8 inches on center, in top surface. Provide fittings and accessories that mate and match with U–channel and are of the same manufacturer.

Fabricated Supporting Devices: Shop–or field–fabricated supports or manufactured supports assembled from U–channel components.

1. Steel Brackets: Fabricated of angles, channels, and other standard structural shapes. Connect with welds and machine bolts to form rigid supports.

EXECUTION

Install supporting devices to fasten electrical components securely and permanently in accordance with NEC requirements. Coordinate with the building structural system and with other electrical installation.

Raceway Supports: Comply with the NEC and the following requirements:

1. Conform to manufacturer's recommendations for selection and installation of supports.
2. Strength of each support shall be adequate to carry present and future load multiplied by a safety factor of at least four, but in no cases shall be less than 200 lbs in the strength of each support.
3. Install individual and multiple (trapeze) raceway hangers and riser clamps as necessary to support raceways. Provide U–bolts, clamps, attachments, and other hardware necessary for hanger assembly and for securing hanger rods and conduits.

Miscellaneous Supports: Support miscellaneous electrical components as required to produce the same structural safety factors as specified for raceway supports. Install metal channel racks for mounting cabinets, panelboards, disconnects, control enclosures, pull boxes, junction boxes, transformers, and other devices.

In open overhead spaces, cast boxes threaded to raceways need not be supported separately except where used for fixture support; support sheet metal boxes directly from the building structure or by bar hangers. Where bar hangers are used, attach the bar to raceways on opposite sides of the box and support the raceway with an approved type of fastener not more than 24 inches from the box.

Fastening: Unless otherwise indicated, fasten electrical items and their supporting hardware securely to the building structure, including but not limited to conduits, raceways, cables, cable trays, busways, cabinets, panelboards, transformers, boxes, disconnect switches, and control components in accordance with the following:

1. Fasten by means of wood screws or screw–type nails on wood, toggle bolts on hollow masonry units, concrete inserts or expansion bolts on concrete or solid masonry, and machine screws, welded threaded studs, or spring–tension clamps on steel. Threaded studs driven by a powder charge and provided with lock washers and nuts may be used instead of expansion bolts and machine or wood screws. Do not weld conduit, pipe straps, or items other than threaded studs to steel structures. In partitions of light steel construction, use sheet metal screws.
2. Holes cut to depth of more than 1–1/2 inches in reinforced concrete beams or to depth of more than ¾ inch in concrete shall not cut the main reinforcing bars. Fill holes that are not used.
3. Ensure that the load applied to any fastener does not exceed 25 percent of the proof test load. Use vibration– and shock– resistant fasteners for attachments to concrete slabs.

SECTION 16452 – GROUNDING

PRODUCTS

Grounding and Bonding Products: Types as indicated. Where types, sizes, ratings, and quantities indicated differ from NEC requirements, the more stringent requirements and the greater size, rating, and quantity indications govern.

Conductor Materials: Copper.

Equipment Grounding Conductor: Green insulated.

Grounding Electrode Conductor: Stranded cable.

Bare Copper Conductors: Conform to the following:

1. Solid Conductors: ASTM B–3.
2. Assembly of Stranded Conductors: ASTM B–8.
3. Tinned Conductors: ASTM B–33.

Ground Bus: Bare annealed copper bars of rectangular cross–section.

Braided Bonding Jumpers: Copper tape, braided from No. 30–gage bare copper wire and terminated with copper ferrules.

Bonding Strap Conductor/Connectors: Soft copper, 0.05 inch thick and 2 inches wide, except as indicated.

Connector Products: Listed and labeled as grounding connectors for the materials with which used.

Pressure Connectors: High–conductivity plated units.

Bolted Clamps: Heavy–duty units listed for the application.

Exothermic Welded Connections: Provided in kit form and selected for the specific types, sizes, and combinations of conductors and other items to be connected.

EXECUTION

Equipment Grounding Conductor Application: Comply with NEC Article 250 for sizes and quantities of equipment grounding conductors, except where larger sizes or more conductors are indicated. Install equipment ground conductors in all feeder and branch circuit raceways.

Separately derived systems required by NEC to be grounded shall be grounded as approved by the authority having jurisdiction.

Installation, General: Ground electrical systems and equipment in accordance with NEC except where grounding in excess of NEC requirements is indicated.

Grounding Electrode Conductor: Provide insulated copper conductor, sized as indicated, in conduit. Bond the ground conductor conduit to the conductor at each end. Where a dielectric fitting is installed in the main metallic water service pipe, connect the ground conductor to the street side of the fitting. Do not install a grounding jumper around dielectric fittings. Bond the ground conductor conduit to the conductor at each end.

Braided–Type Bonding Jumpers: Install to connect ground clamps on water meter piping to electrically bypass water meters. Use elsewhere for flexible bonding and grounding connections.

Route grounding and bonding conductors using the shortest and straightest paths possible without obstructing access or placing conductors where they may be subjected to strain, impact, or damage, except as indicated.

Connections: Make connections in such a manner as to minimize possibility of galvanic action or electrolysis. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.

Tighten grounding and bonding connectors and terminals, including screws and bolts, in accordance with manufacturer's published torque tightening values for connectors and bolts. Where manufacturer's torquing requirements are not indicated, tighten connections to comply with tightening torque values specified in UL 486A and UL 486B.

Compression–Type Connections: Use hydraulic compression tools to provide the correct circumferential pressure for compression connectors. Use tools and dies recommended by the manufacturer of the connectors. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on the conductor.

Moisture Protection: Where insulated conductors are connected to ground rods or ground buses, insulate the entire area of the connection and seal against moisture penetration of the insulation and cable.

Deficiencies: Where ground resistances exceed specified values, and if directed, modify the grounding system to reduce resistance values. Where measures are directed that exceed those indicated the provisions of the Contract, covering changes will apply.

SECTION 16476 – DISCONNECTS, CIRCUIT BREAKERS AND FUSES

PRODUCTS

Enclosed Fusible Switch: NEMA KS 1, Heavy Duty Type, handle lockable with 2 padlocks, enclosure consistent with environment where located, Minimum Fault Current Rating of 200,000 symmetrical rms amperes.

Enclosed Molded–Case Circuit Breaker: NEMA AB 1, handle lockable with 2 padlocks.

1. Characteristics: Frame size, trip rating, number of poles, and auxiliary devices as indicated; interrupting capacity rating to meet available fault current, 10,000 symmetrical rms amperes minimum; with appropriate application listing when used for switching fluorescent lighting loads or heating, air conditioning, and refrigeration equipment.
2. Lugs: Mechanical lugs and power–distribution connectors for number, size, and material of conductors indicated.
3. Enclosure: NEMA AB 1, Type 1, unless specified or required otherwise to meet environmental conditions of installed location.

Fuses: NEMA FU 1 nonrenewable cartridge fuse, class as specified or indicated, current rating as indicated, voltage rating consistent with circuit voltage.

1. Main Service: Class L fast acting.
2. Main Feeders: Class J time delay.
3. Motor Branch Circuits: Class RK1 time delay.
4. Other Branch Circuits: Class RK5 non–time delay.

EXECUTION

Connect enclosed switches and circuit breakers and components to wiring system and to ground as indicated and instructed by manufacturer. Tighten connectors and terminals, including screws and bolts according to equipment manufacturer's published torque tightening values for equipment connectors. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals according to tightening torques specified in UL Standard 486A.

END OF ELECTRICAL SECTION

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